PAPER 20

COMMUNICATIONS

S.E. Kigundo

Introduction

1. Communications, particularly telecommunications, need a separate and comprehensive treatment in the Team report because they are at the heart of government transactions; without an adequate system the administrative machinery for all sectors of the economy would be ineffective.

2. Telecommunications include all forms of point-to-point and broadcast communications, i.e. transmission of information or intelligence by electrical or radio means, and also all methods of radio location and navigation. Telecommunication systems are used to provide a wide variety of services to the public, private and military sectors; we will categorise these services by the transducers they use at their transmitter and receiver terminals, the type of information they convey, and channel bandwidths or bit rates for digital systems.

3. By far the most important services for Uganda today are:

Post and telecommunications

Broadcast radio and TV

Air navigation services

Meteorological services

Of the mass media services, broadcast radio has a very much higher penetration than TV and therefore must be considered a much higher priority for rehabilitation; the latest official audience survey report published in 1972 indicated that there were 4.7m. listeners to radio (practically all in their own homes) while there were 0.18m. viewers at home and 0.6m. in public places. There is reason to believe that the number of TV viewers in public places has fallen very dramatically since.

4. The report therefore is divided into four parts according to the above classification. Each part outlines the situation in which each sub-sector finds itself after the liberation war (May 1979), reviews the major events of the last eight years, and compares the post-liberation situation with that of 1970/71. The war damage is described and a reconstruction/rehabilitation plan is proposed based on stated assumptions of policies and resources. Finally some suggestions are made on possible sources of technical aid and finance.

1. POST AND TELECOMMUNICATIONS

5. Uganda Posts and Telecommunications Corporation (UPT) falls under the Ministry of Power and Communications and is responsible for the postal service, telephone and telex (including telegraphy), external (international) telecommunications, and radio frequency allocation and registration within the framework of the IFRB and ITU. This corporation was set up under Decree No. 15 of 1977, basically to take over the affairs of the East African Posts and Telecommunications Corporation (EAPT) and has been operating accordingly since then.

6. The Uganda Region of EAPT and latterly UPT, despite its great importance for the economic and social infrastructure of Uganda, has suffered greatly since the end of 1972. After the departure of non-Uganda Asians in 1972, the headquarters of EAPT in Kampala was 'informally' moved to Nairobi and continued to operate from there until July 1977 when the East African Community broke up. With the headquarters in Nairobi, Kenya and Uganda gradually but steadily started moving apart. Discussions with senior officials in UPT showed they felt Uganda was being increasingly under-served; this apparently manifested itself in a reluctance to sanction new capital projects and replace obsolescent equipment and plant. The supply of loan funds also became more scanty.

7. Another problem that arose about the second half of 1974 was that the free movement of items from the Central Stores in Nairobi to Kampala became difficult, until

eventually Kenya Region declared all items in the Nairobi stores belonged to them. Kampala was cut off from supplies which a year or so previously could be obtained by signing an internal stores requisition. Logically UPT should have started indenting from scratch but insufficient foreign exchange was allocated.

8. Yet another problem arose over training. It became extremely difficult after 1972 for a Uganda Region engineer or technician to obtain one of the overseas training fellowships available to all three partner states of the E.A. Community. And after July 1977 the use of the Central Training School in Nairobi had to be paid for in foreign exchange.

9. It is further estimated that subscribers (telephones, telex, etc.) owe UPT a total amount in the region of Shs. 200m. This has not helped the financial situation of the corporation.

10. One cannot overemphasise the importance of the UPT telecommunications network; every other telecommunication service depends on it. Other parts of this report will explain the nature of dependence and its consequences in greater detail. But the point must be made and underlined that we must get our policies and priorities right for UPT if we are to stand any chance of achieving satisfactory communication services in the other sub-sectors.

Roots of Current Problems

War Damage:

11. On the question of damage suffered by UPT as a direct or indirect result of the liberation war, the report received from a senior official of UPT is at Annex 20.1 in an abridged form.

12. This Annex speaks for itself, but I must emphasise the extensive damage to subscriber installations generally, and Masaka and Mbarara in particular - their exchanges and buildings were completely destroyed. Several junction routes, such as Kampala/Entebbe and Kampala/Bombo suffered far-reaching damage; this also applied to the major radio link stations to the south-west of Uganda.

13. The problem is further compounded by the major damage to the maintenance workshop, including tools, equipment and stores and the looting of practically the whole fleet of vehicles. It is a very grave situation indeed, where even the very basic requirements for applying first aid are not available.

14. Although we have focused here on the actual war damage, we cannot afford to ignore the other far-reaching effects of years of neglect, disrepair and obsolesence. The problem must be crystallised so a solution can be attempted on both fronts. We shall see also that the question of development or extension planning will also influence our policy decisions.

Activity during the Period 1970-79:

15. During the early part of this period, the Uganda Region of the then EAPT lacked sufficient technical manpower and, as a result, only about 75% of any annual development programme was actually executed.

16. Meanwhile the urban growth in demand for services had exceeded the available local and trunk line plant. One effect of this was an ever growing list of 'waiters'; many potential subscribers, especially in Kampala, have been waiting more than four years for service. Another effect was increased exchange congestion and hence accelerated ageing, and further delays for operator-connected calls.

17. Towards the end of this period the problems multiplied and became acute. Much of the plant and equipment taken over by UPT in 1977 was old and obsolete and should have been put on a replacement timetable. The result was that the spare parts for this equipment became increasingly difficult to obtain and were very expensive when found. Further, the useful life of spares in old equipment is short, and such equipment became at best unreliable.

18. Because of the state of the network and the general economic and political conditions in the country, planned maintenance gradually gave way to emergency breakdown repair; there was an increasingly severe shortage of tools, spare parts, fuel (heavy diesel) and transportation generally. In all this there could be no meaningful plan to replace obsolete equipment since a major cause of many of the problems was lack of foreign exchange.

19. Lack of inputs led to an extremely unprofitable use of the available manpower; in fact there was an apparent excess of manpower. Many staff worked under intimidation and had to implement decisions that were professionally of very poor judgement. A glaring example is the Arua satellite project.

20. The service deteriorated so badly during this period that one considers it a miracle that the system did not completely collapse.

21. The major external influence was the gradual disintegration of the EAPT from 1973 onwards as already described above.

The Reconstruction Task Ahead

22. The solutions to these deep-rooted problems will take time and will require a sound framework of policy, reappraisal and finance both in local and foreign currency.

23. But before we move we must take our bearings and map out the course. This means that we must get a quantitative picture of the network, say at the beginning of 1979 and compare it to the situation at the beginning of 1970, take into account the war damage and the proposed development plan, and then begin to work out a solution in a true perspective.

24. Annex 20.2 gives approximate and comparative figures for the state of the network in 1970 and 1979. It must be mentioned that 10 of the 20 automatic exchanges are now obsolete and overdue for replacement. A similar situation obtains for the diesel generating sets, at least 11 of which (accounting for 600vA) need replacement and also the major manual boards including the Kampala AMB.

25. UPT worked out a development programme prior to the fall of Kampala whose main thrust was to:

- extend congested and replace obsolete exchanges
- phase extension of the microwave network to include Entebbe-Kampala-Masaka-Mbarara-Kabala with spurs to Mityana and Bukoba
- replace major standby power generators
- acquire more vehicles for construction, installation and maintenance
- start a number of capital building projects
- acquire a mobile radio monitoring station

It is understood of course that exchange expansion can only be meaningful if accompanied by a reinforcement of the junction and distribution network. The microwave route to the south-west was also planned to carry TV and radio programmes.

26. What makes the rehabilitation of UPT very difficult is the reconciliation of short term measures, which could return the network to 1970 levels in per capita terms, with the certainty that these measures will have to be completely changed within a few years. This is specially significant because we are dealing with a network and not with separate non-interacting entities. Clearly a policy must be defined and made known to all concerned and on it will hang the operational plan for rehabilitation. We shall have definite proposals on this later.

27. There are constraints and obstacles to the achievement of these objectives. The one that stands out most prominently is the financial constraint. Examination of the Corporation's contingent or actual liabilities as at 11 April 1979 gives the following approximate picture:

Local borrowing	Shs. 127.6m.
Overseas loans	144.7m.
Payments outstanding-contractual	86.1m.
International obligations	15.0m.
Capital building programme, outstanding payment	11.5m.

One does not have to delve deeper to see that the Corporation is greatly in debt both in local and foreign currency. The recurrent revenue for the year 1979, which had been estimated at approximately Shs. 269m., may turn out to be no more than Shs. 100m. because of the war.

28. Equipment and buildings are another major constraint. In addition to having to find the local and foreign exchange for the necessary equipment, suppliers very often quote delivery dates of between 9 and 12 months for the principal items. Further, there is doubt as to whether the Ugandan building industry can cope with the sudden demands that are sure to be imposed on it.

29. The gigantic task of rehabilitation will of necessity require much more personnel than UPT has at the moment. Manpower reinforcement in the planning group and at the field engineering level will be desperately required.

Policy Issues and Resources Needed

30. It is recommended that immediate provision be made for the acquisition of the basic tools and equipment that the engineers and technicians need in order to carry out their functions. At the same time, orders for spare parts for existing deteriorated (but still serviceable) plant should be ordered. Then to take the first step towards rehabilitation, a minimum fleet of assorted vehicles should be acquired. A very rough estimate of the resources required for this first step to be taken before the end of 1979 is approximately Shs. 20m., and practically all of it will be in foreign exchange. This figure is only indicative and needs to be refined and cross-checked. This should not be too difficult since UPT have already prepared lists of the requirement referred to in this paragraph.

31. The second recommendation, closely connected with the first, is that funds should be made available to purchase distribution, as well as a limited amount of junction, cable. This recommendation is basically to get the network of Kampala and nearby satellite exchanges off the ground again after the extensive damage. An indicative planning figure here is about Shs. 15m.

32. Recommendation three affects the relationship between Kampala and up-country exchanges and is made in the light of UPT's development plan. The policy here is that a minimum number of circuits must be provided on those trunk routes that were destroyed, on the following priority guidelines:

(a) Kampala-Entebbe

(b) Kampala-Mpigi-Masaka-Mbarara-Kabale

(c) Kampala-Mityana

Even this attempt, pruned to the bones, cannot restore the network to 1970 levels but it must still be done, even if this means doing the work at least twice. The first round would effectively be emergency action to establish some form of communication again, and this may mean having a more extensive radio call system than has been the case before. There is an existing 1KW base station at Kampala with an (extendable) capacity of four channels. But non-government subscribers must purchase their own terminal equipment at a cost of about Shs. 0.5m. each.

33. Round two would probably be to set up a microwave link between Kampala and Entebbe in view of the importance of this route and in the knowledge that the desirable number of circuits on this route today is over 400. The exercise could be completed quickly and at a cost of approximately Shs. 8m. since the sites for terminal and repeater stations have already been acquired. But the delivery dates for the equipment (at best 12 months) may well cause a bottleneck.

34. Round three of recommendation three would be to set up 24 channel vhf links for the routes in (b) and (c). Again the sites for repeater and terminal stations have been surveyed and the acquisition of the land is not expected to be a problem. I envisage that round three will need a lead time of about 18 months. It is difficult to give meaningful estimate of cost here but an indicative planning figure would be Shs. 0.01 m. per route km.

35. Recommendation four concerns complete reconstruction of the exchanges at Masaka, Mbarara, Lira, Mityane and Mpigi. These should be designed and constructed to reflect the current demand for services in those towns. This is a major capital projects plan that may/may not be completed by June 1981 depending on the availability of funds. Much coordination is called for in the case of Masaka and Mbarara with the regional and town planners.

36. Recommendation five is that a start may be made on the extension of the microwave network to the south-west but this is not at all intended for completion before June 1981.

37. Recommendation six is that the building programme as it now stands should be thoroughly revised to bring it in line with the rehabilitation plan thinking. Nevertheless the Mpoma (Mukono) satellite ground station construction programme should go ahead unimpeded. This may require about Shs. 25m. in foreign exchange and Shs. 3m. in local exchange during the 1979/80 financial year.

38. Recommendation seven is that there should bo no change in tariffs, but that UPT should make all efforts to collect the Shs. 200m. (approximately) owed to it by subscribers. This will be of great assistance at a time of financial hardship.

39. Recommendation eight would be that UPT in this critical period of reconstruction would benefit tremendously if two very experienced people are recruited in the fields:

(a) Telecommunications systems planning, and

(b) Radio system planning. Additional expatriate assistance may be required in the field of switching systems in the areas of both planning and maintenance. Training fellowships for engineers and technicians shoudl also be sought.

The Contribution of External Assistance

40. UPT has foreign debts of the order of Shs. 170m. and over half of this is owed to IBRD.

41. Nevertheless, Uganda - with so many urgent needs laying claim to its scarce resources - cannot effect this rehabilitation alone. It is recommended therefore that Uganda approaches the UNDP/ITU with a project proposal incorporating a large equipment component and an expertise and fellowship component. The EEC and ADB also be approached along similar lines.

42. It is further recommended that bilateral technical and financial aid be sought from Japan and UK.

Additional Remarks

43. The postal services will be restored to 1970 levels when the transport system recovers and some destroyed buildings are rebuilt.

44. But there are other postal needs also, for example:

- Locks and keys for private letter boxes and padlocks for private mail bags.
- P.O. special stationery.
- Date stamps, etc.
- Stamp cancelling machines.
- Strong rooms for Savings Departments.
- Stamp vending machines.

- Weighing scales for letters.
- Printing of postage stamps.

It is estimated these would cost about Shs. 2.5m. in 1979/80 and Shs. 1.5m. in 1980/81.

45. The rehabilitation programme proposed above would have the following financial implications:

	(Shs. m.)	
Telecommunications	146.0	165.0
Postal	2.5	1.5
	148.5	166.5

2. BROADCAST RADIO AND TV

(a) RADIO

Background

46. In Uganda radio broadcasting is carried out by Radio Uganga which is part of the Ministry of Information and National Guidance. Because of its high population penetration it is an extremely useful and reasonably inexpensive vehicle for mass information, education and entertainment. The latest official audience survey report published in 1972 indicates that there were then an estimated 1.1m. sets in homes, for which the average number of listeners per set was estimated at 4.3. The police radio network is not covered in this report for security reasons.

47. All programmes at the moment originate at Kampala through a master control room in Broadcasting House. They are then fed to two short wave (SW) transmitters in Kampala (popularly called the 'red' and 'blue' channels) and beamed out to cover as much of Uganda as possible. The blue channel has been used primarily for Bantu languages and the red one for non-Bantu languages. A total of 18 languages is used.

48. To complement the two SW transmitters in Kampala there are also five medium wave (MW) stations placed in the various regions of Uganda at Arua, Mewagga, Bobi, Kabale and Butaba. Programme information is received by these stations using either or both the off-air reception method and radio relay links. It appears to have been the basic intention that these stations (whose coverage is limited) should transmit in those languages understood in the particular region.

49. In addition, Radio Uganda operates an external broadcast service from Soroti. These programmes are also receivable in many parts of Uganda.

Roots of Current Problems

War Damage:

50. This has been quite extensive. Most of the damage is in the form of looted tools and equipment, vehicles and furniture and fittings. However, three of the nine link stations were totally destroyed and we have received no reports for Arua and Bobi transmitting stations. The presidential mobile recording vehicle is also missing. The extent of the war damage is tabulated at Annex 20.3.

51. In addition to the actual war damage there has been a gradual but steady deterioration in the standard of maintenance of the equipment and an insufficiency of the vital pieces of equipment.

Activity during the Period 1970/79:

52. All studio and transmitter equipment greatly deteriorated during this period due

to the non-availability of spare parts. As a result some equipment was cannibalised to repair other equipment - this in turn led to a state of working with no standby systems or simply at reduced power, or to not being able to handle more than a certain number of programmes simultaneously, and at worst to closing down some services.

53. Professional and technical staff were frustrated because of the lack of tools and other requirements for efficient and meaningful operation. Professional advice was often regarded with contempt and innovation snubbed.

54. The Soroti External Broadcast Station and Arua MW station were built and commissioned (only partly for Soroti) during this period.

External Influences:

55. These have mainly made themselves felt through the regulating effect on the supply of spare parts and equipment. There is reason to believe the statement made by senior officials that harsh and unfriendly terms of payment by many suppliers made the acquisition of spare parts extremely difficult, even where money was available.

56. It has also been put to me that delivery dates for the equipment and other spares were unduly long for Uganda-originated orders. In effect, even before the formal declaration, trade embargoes existed against Uganda.

57. Means of transportation of all kinds of cargo en route to or from Uganda by cargo flights, road, rail and Mombasa port were difficult to negotiate and severe transit damage sometimes occurred.

58. Unscrupulous profiteering companies sometimes managed to get orders placed by corrupt senior officials who did not have Uganda's interest at heart, and even supplied worthless equipment and systems.

The Construction Task Ahead

59. Annex 20.4 gives a panoramic view, under the various headings, of the state of the network in 1970 and 1979. It should be explained however, that of the five news studios, two are incomplete and the remaining three have old and obsolete equipment.

60. The reconstruction task should be attacked from two sides; spare parts, tools, measuring equipment, etc. should be acquired as soon as possible in order to repair the major equipment if that is still serviceable, and new equipment should be acquired to replace what is obsolete, and also to fill the gaps in the gear that a radio network must have in order to function meaningfully.

61. Rehabilitation of Radio Uganda is a gigantic task that will tax the financial resources of the Government since Radio Uganda has no other source of income. Most of the inputs will have to be imported and paid for in foreign exchange. I am informed that Radio Uganda owes Great Britain large sums of money in connection with the MW expansion project, but I have not been able to confirm this myself. Also Brown Boveri of Switzerland has yet to be paid for the second transmitter at Soroti. The income from the commercial section of Radio Uganda would be enhanced if a third channel were opened as recommended in paragraph 67 (a).

62. Another constraint may be construction. The new studios at Nakasero were improvised and as well as being insufficient in number they are inadequate in quality. A new site may have to be acquired for more and better studios. Housing for staff, equipment and offices at the various stations is also inadequate. There are other civil works required here and there; for example sealing the access road and the yard at Soroti will reduce the dust problem and increase the life expectancy of electronic equipment. Another example is that the present UEB power supply to Soroti cannot supply the required power which is in excess of 500 kw.

63. It was not possible to get any figures on the manpower standing of Radio Uganda. But it is most likely that at least during the initial rehabilitation period external assistance will be required to relieve the pressure.

Policy Issues and Resources Needed

64. On the assumption that the present network is to be rehabilitated and put on a more or less sound footing without in any way increasing the total output capacity, but allowing for redeployment of equipment, I would make the following proposals:

(a) Studios: the Nakasero news studios should be rehabilitated without delay so that all five are operational. At Broadcasting House the listening booths should be equipped so that producers can check programmes, and an electronic workshop should be set up.

(b) Outside Broadcast Unit: spare parts should be acquired and a phased replacement schedule for obsolete equipment put in motion.

(c) Radio repeater stations: the destroyed stations - like Magajo, Mbarara and Dokolo - should be reconstructed as soon as possible. A replacement schedule for the obsolete stations should be worked out and executed uniformly within two years.

(d) Naguru Central receiving and monitoring stations: the remaining building should be completed as soon as possible and the receiver system rehabilitated.

(e) Medium Wave Transmitting stations: spare parts for these should be acquired, and the transmitters refurbished, starting with Kibira Road and Kabale. This programme should be consistent with that of rehabilitating the repeater stations. Mbale should be replaced during 1980.

(f) Short Wave Transmitting stations: the second Bugolobi transmitter should be replaced during 1980. Existing contractual obligations at Soroti should be honoured as they fall due, but the system should not be expanded.

(g) Vehicles: a limited number should be purchased for outside broadcast and engineering use.

65. The programme proposed above is expected to cost about Shs. 13m. during 1979/80, and Shs. 22m. during 1980/81. Approximately 80% of these values will be in foreign exchange.

66. Other matters of a policy nature have been brought up during discussions. These include the increase in the number of short wave channels, a more flexible system of providing programme material to the up-country transmitters, re-establishment of an educational broadcast system, the provision of cheap radios (and batteries) to the masses.

67. My reactions to these suggestions are as follows.

(a) Provided financial resources additional to those committed to the above rehabilitation plan are available, a third SW channel would be most useful for educational broadcasts, the commercial unit and special programmes. Such a channel might cost in the order of Shs. 8m., but given the added advantages that would accrue from it, I would strongly recommend its establishment.

(b) Allowing the regional transmitting stations to originate their programme material (effectively, local radio) is a matter of high political policy. Economic and operational considerations demand studios and extra manpower at each station.

(c) Schools broadcasting should be re-established; there is a public outcry for it.

(d) Local assembly factories for transistor radios at Kampala and Jinja should be revived. If necessary an initial large import of radios may be entertained while the local plant 'warms up'.

(e) The battery (dry cell) factory at Kampala manufacturing under license from Union Carbide should be revived, and a stricter control on quality exercised.

The Contribution of External Assistance

68. Practically all Radio Uganda's income comes direct from the Government (the commercial section's revenue is still relatively small). Extra financial assistance may be available in the form of soft loans organised bilaterally with say UK, Japan, France etc. Multilateral aid could also be forthcoming from the EEC, UNDP/ITU/IBU and IBRD.

69. It would be extremely useful if technician and engineering staff could be given an opportunity to go and work in the factories and radio stations in those countries where the equipment that they maintain originates. In addition manpower assistance through, say, ITU would be most welcome.

(b) TELEVISION

Background

70. Uganda started a black and white TV service in 1965 operating at vhf with 625 lines. It falls directly under the Ministry of Information and National Guidance. There is only one programme channel that is fed to several transmitters around the country.

71. A colour service (System PAL/B) was started in July 1975. It was estimated in August 1977 that there were 80,000 black and white sets, and 1,000 colour sets with an estimated average number of eight viewers per set (compare this to radio sets in para. 46).

72. Live programmes from other countries may be received and retransmitted either via the earth station in Kenya and then by microwave to Kampala or via Arua earth satellite station, and by domestic satellite to Kololo.

Roots of Current Problems

73. On the whole, this has been in the form of looting of tools, spare parts, measuring equipment, vehicles and furniture and fittings. In addition, however, Mbarara transmitting station was totally destroyed, as was the brand new equipment (yet un-commissioned) at Masaka. Annex 20.5 gives more details. As for Radio Uganda, there has been a gradual but steady decline in the quality of equipment, and inavailability of other vital equipment.

Activity during the period 1970-79:

74. Uganda Television (UTV) and Radio Uganda report to the same directors (e.g. of engineering, of broadcasting, etc.), and their activities and problems are very similar in nature.

75. The only major advance has been the introduction of colour television in 1975.

76. It is a miracle that UTV has managed to stay on the air despite extremely inadequate facilities; this point will come out in detail when the rehabilitation plan is discussed later in the paper.

77. The external influences are exactly analogous to those for Radio Uganda and are not repeated here.

The Reconstruction Task Ahead

78. Since, apart from the Mbarara and Masaka transmitting stations, there was relatively little damage to the TV network, the immediate general pre-war picture would

be a useful starting point for formulating a rehabilitation programme that is basically aimed at rectifying the deterioration and neglect of the last eight years; this picture is given in Annex 20.6. It should be noted that of the 10 transmitting stations, Gulu has been off the air for some time as a result of Lira (the link) being off.

79. As stated in paragraph 3 it is my opinion that the rehabilitation of the radio network should take preference over TV. However, if the political decision is taken to continue the TV service in Uganda, the public would expect an acceptable network without necessarily an increase in the basic area of coverage (which is now very approximately 35% of Uganda's land surface with an average population density of about 250 persons/square mile). The financial implications of such a decision must be carefully examined: the various spare parts and equipment needed, including viewers' sets, are expensive, and practically the total cost will be in foreign exchange.

80. The second major constraint on achieving a reasonable network is manpower. Although actual figures were not forthcoming during our discussions, the question of shortage of manpower continually cropped up. A step will have to be taken towards the solution of this problem.

81. Finally there is the transportation obstacle which is very real both for the engineering staff of the various stations, and the many people and the equipment involved in outside broadcast (OB) programmes. OB unit programmes have taken on an increasingly important role because of the feverish activity in the field coupled with a severe shortage in the number of studios.

Policy Issues and Resources Needed

82. The TV service is at a crossroads. Government has two options available to it; to close down the service completely, or to continue it but with certain minimum internationally accepted technical and operational standards. If the service is retained, the following schedule (expected to cost Shs. 21m. in 1979/80 and Shs. 23m. in 1980/81 with 90% in foreign exchange) would be proposed.

83. Firstly, the destroyed transmitters at Masaka and Mbarara should be replaced, and the Lira one replaced and put back on the air.

84. Secondly, the studio equipment should be repaired/replaced (including the lighting system) and supplementary equipment purchased. It is difficult to believe, but true nevertheless, that UTV has only one colour VTR, one telecine and one non-working obsolete colour camera. It is imperative that two additional colour VTRs and telecines, and six colour cameras complete with accessories, as well as several tens of microphones, should be acquired as soon as possible. The inter- and intra-studio communication system (control room/cameramen/machines) is also badly in need of repair/replacement.

85. Third, we must address ourselves to the transmitter station network. One fact suddenly hits us; the relay stations are the weak links in the chain. For the most part these are located in the middle of nowhere, and are basically unattended. Faults occur frequently, e.g. power failure on long UEB lines etc. We should agree that as a matter of policy these relays should be regarded as serving a basically standby function and that off-air-linkage, for the moment at least, should be preferred. Of course one is always looking forward to the days when the UPT microwave network will be used for carrying TV programmes. Meantime, we must appreciate the logical consequences of our decision; the picture quality will be slightly inferior, we will need more powerful transmitters all round, and keeping the Kampala transmitter on the air becomes critical. The last two are advantageous, while the first is not. The plan now is that the replacement units for Masaka and Mbarara should be 5KW each, Mbale should be brought up to 5KW also (it is a key link) and the Lira replacement should be at 10KW. Also, Kampala in view of its key role now should be assigned a second transmitter of say 15KW.

86. Fourth, the central stores should be re-equipped with spare parts for general and specific equipment, and the various repair workshops should be provided with tool boxes and measuring equipment.

87. Fifth, it should be ensured that each transmitter has two high grade off-air

receivers. Proposals to re-deploy the following equipment - received but not yet installed - should be carefully examined with a view to minimising new commitments.

(a) Masindi (Ch.11) 0.5KW Transmitter
(b) Hoima (Ch.9) 0.5KW "
(c) Fort Portal 0.5KW "
(d) Arua (extra) 0.5KW "
(e) Kasese 5W "
(f) Tororo 5W "
(g) Moroto 5W "
(h) Biko relay station equipment
(i) Kabuga (Mbale) relay station equipment
(j) Erusi East relay station equipment

88. Sixth, is the question of transport. It is reasonable to entertain a request for one landrover per transmitting station. In addition the outside broadcast unit deserves special attention; two vehicles per OB van and a mobile silenced generator of say 10kVA would be reasonable.

The Contribution of External Assistance

89. Financial assistance will certainly be required. One could approach multi-lateral sources such as UNDP, EEC, IBRD and EEC. Most of the existing equipment has been bought from West Germany, UK, Japan and USA: these countries may be willing to assist us bilaterally.

90. Technical assistance is also desperately needed. Both engineers and technicians should undergo formal courses on the PAL/B colour system, and then receive follow-up training on the job. It would be most fruitful if other TV networks - e.g. the BBC - could assist in this training exercise by receiving Ugandan engineers and technicians in their organisation, and also second experienced personnel to UTV. Other technical aid agencies should also be approached.

3. AIR NAVIGATION SERVICES

Background

91. The Directorate of Civil Aviation (DCA) is under the Ministry of Power and Communications, and although its headquarters are at Kampala its operational staff are basically stationed at Entebbe and Soroti (E.A. Flying School).

92. Originally it was part of the East African DCA, but when the community collapsed in July 1977 it had to become an entity on its own, albeit with strong dependence on the Kenya DCA.

Roots of Current Problems

93. There was extensive damage to wiring and equipment at the control tower complex which affected especially the communication equipment (hf and vhf).

94. Stores for spart part holdings for all the equipment were badly looted and practically wiped out.

95. Office equipment and furniture estimated at a replacement cost of Shs. 0.3m. was stolen. There was also a loss of vehicles.

Activity during the period 1970-79:

96. Starting at about the time of the declaration of the economic war, equipment

and plant began to deteriorate because of lack of spare parts, and the unavailability of qualified professional engineering and technician staff.

97. This deterioration manifested itself at the most embarrassing moments; standby power supplies failed to start up when the mains went off, vital equipment would break down when controllers were communicating with aircraft etc.

98. The situation was so desperate that DCA officials feared that ICAO would clamp down on them anytime.

99. During this period the Uganda Government declared its intention to set up an international airport at Arua. Thus in 1973/74 DCA bought the relevant equipment, which arrived in 1975 and has been stored in Jinja ever since; the new airport project never saw the light. Immediate consideration should be given to the modification of this equipment for use at Entebbe where necessary.

External Influences:

100. When the E.A. Community, and hence the DCA broke up, there was friction between the former partner states. At a meeting between Kenya, Uganda and Tanzania, co-ordinated by ICAO Cairo, it was decided that each state would set up its own flight information region (FIR). Kenya already had one, and Tanzania commissioned its FIR in December 1978. The purpose of the Uganda FIR was to:

- control all aircraft flying in Ugandan airspace;
- provide search and rescue services;
- establish communication channels with the neighbouring countries.

101. This was presumably a political decision because Nairobi's FIR was able to continue covering most of Uganda. Indeed as events have turned out it has continued to do so at an annual charge of Shs. 7m. in convertible currency.

102. The break-up of the DCA made it difficult for Entebbe to continue receiving Airworthiness Services which were formally provided under contract between the E.A. Community and the British Civil Aviation Authority. Uganda decided to hire the services of Egyptian surveyors at an annual cost of about Shs. 9m.

The Reconstruction Task Ahead

103. Annex 20.7 gives the DCA equipment position in 1970 and 1979. The picture is very clear when one reads the remarks column; everything seems to be giving trouble, nothing seems to work. Many pieces of equipment are old and obsolete. Some of the more recent equipment which is nevertheless giving trouble was manufactured by firms whose competence in the field of navigational aid equipment is dubious to say the least; apparently there is collaborating evidence from even the newer airports in East Africa.

104. There can be no dispute that something must be done immediately to pull DCA out of its most embarrassing position. Even if Uganda continues to use Nairobi's FIR, there must be certain minimum acceptable air navigation facilities at Entebbe, otherwise airlines will not risk their planes and contents. The consequences of Entebbe being 'blacklisted' will reverberate all through the economy.

105. There are obstacles and constraints with which we must come to terms in this reconstruction period. First and foremost there is finance; whichever path we take to rehabilitate DCA a considerable outlay of money, basically in foreign exchange, will be required.

106. The manpower problem is acute, especially taking into account the fact that Entebbe must operate 24 hours each day. Every section seems to be in trouble; engineering, airworthiness, operations and licensing, and air traffic control.

Policy Issues and Resources Needed

107. Before the liberation war intensified, DCA had tendered for a FIR and additional

navigation aids. The tenders were adjudicated and Thomson CSF would have been awarded the contract (in the sum of US$15m.) if circumstances had not changed.

The essential components of the FIR for Uganda are the establishment of:

(a) HF radio circuits (main and standby) RTTY between Entebbe and Kinshasa, Khartoum, Kigali and RTTY/LTTY from Entebbe to Dar-es-Salaam and Nairobi, all these complete with receive and transmit antenna systems and microwave link and terminal equipment. Circuits are also provided to link Entebbe to other Uganda airports.

(b) a message switching centre for the AFTN.

(c) the HF voice (mobile and fixed) equipment to link with the neighbouring FIRs and other Uganda airports.

The cost of the above equipment, including installation, commissioning, training and spares for two years of normal operation is estimated at Shs. 50m.

108. Other air navigational aids which were considered in the Thomson CSF quotation, but are external to a FIR set up, were:

(a) ILS - one off for Entebbe

(b) VOR/DME - three off for Kasese, Moroto and Kabale

(c) Primary and Secondary Approach radar for Entebbe

The items (a) and (b) were quoted at Shs. 16m., and item (c) at Shs. 37m.

109. The decision whether or not to acquire FIR (at Shs. 50m.) is partly political, partly economic and partly operational: political because it raises questions of national security and territorial integrity; economic because the project is expensive (and manufacturer's credit is heavy to service) but may on the other hand stimulate more air traffic to Entebbe; operational because it is alleged that Nairobi does not cover all of Uganda's territory on vhf.

110. Assuming that the FIR gets the green light, then in addition to the finance for it, foreign exchange will be needed to repair as well as possible the equipment I have shown to be excluded from the FIR equipment. Otherwise an attempt must be made to repair/replace the equipment at Entebbe and renegotiate the agreement with the Nairobi FIR. Whichever of the above two ways is taken, it will be necessary to rehabilitate the office furniture and fittings, and also to provide for some vehicles.

111. The major resources required will be money, a very large percentage of which will be in foreign exchange, and expatriate staff coupled with overseas and on-the-job training fellowships.

The Contribution of External Assistance

112. It would be extremely useful if ICAO could be persuaded to send expert help for about one month to crystallise the problems facing DCA and to give it a sense of direction.

113. The British Government could also assist through the British Civil Aviation Authority, in both material or financial terms and also in manpower which is desperately needed. Other sources of assistance could be UNDP, EEC and the French Government.

Uganda Airlines

114. This company is covered in the civil aviation paper. The purpose of this paragraph is to draw attention to the fact that the communication system within Uganda Airlines needs attention. It also seems desirable for it to join the SITA network for

inter-airline message communication if it intends to go really international.

4. METEOROLOGICAL SERVICES

Background

115. The Meteorological Department falls under the Ministry of Power and Communications.

Its main functions can be listed under the following headings:

(a) Air Transport - reports on the weather at Entebbe and Soroti must be given to the Control Tower every half-hour.

(b) Agriculture - data of use in agriculture is collected, e.g. rainfall, air and soil temperature, sunshine, hunidity, etc. and statistical records compiled.

(c) Weather forecasts - useful for lake transport and generally.

It is because of its importance for air travel that it has been included as part of this paper.

Roots of Current Problems

War Damage:

116. Although full details are not available yet - especially from outstations, it is believed that most meteorological instruments, equipment in instrument workshops, and office furniture at the eleven observatories were either looted or damaged.

Activity during the period 1970-79:

117. At the beginning of this period, Uganda was a mere region of the East African Meteorological Department whose headquarters was at Nairobi. Uganda, therefore, depended very heavily on Nairobi both for equipment and professional and technical staff; this was undesirable.

118. After the break-up of the East African Community, Uganda discovered that it had a severe manpower shortage. In addition the equipment had become unserviceable due to lack of spares which could not be purchased for lack of foreign exchange. Planned replacement of obsolete equipment also never materialised.

119. Work had come to a practical standstill, but this did not seem to worry the Government, maybe because the Department earns no money.

External Influences:

120. When the EAC broke up, Uganda had to set up an independent meteorological service because most of the professional and technical staff, the telecommunications and major meteorological equipment, as well as the workshops, were stationed in Nairobi.

121. Uganda was ill prepared for this new service; this led to the problem already outlined above.

The Reconstruction Task Ahead

123. A picture of the Department as at 1970 and as at 1979 is given at Annex 20.8.

124. The most urgent task now is to survey the following pieces of equipment at Entebbe and determine whether or not they are really unserviceable as reported to us. Unserviceable units should be replaced urgently.

(a) Weather radar

(b) Weather satellite ground station

(c) HF communications receivers

(d) SSB transceivers (radiotelephones)

(e) Hydrogen generator

(f) Upper air station

125. In respect of item (b) it should be confirmed or otherwise that the ground station is incapable, even when repaired, of receiving signals from a geostationary satellite.

126. Secondly, and also very urgent, all the 11 observatory stations should be re-equipped as soon as possible; their requirements are modest, but their output data is extremely valuable. It should be ensured that they have working radiotelephones to enable them to report once every three hours.

127. Thirdly, it is vital that the Entebbe observatory be in radio or line communication with the control tower so that up to the minute information may be passed on to pilots landing or taking off.

Policy Issues and Resources Needed

128. While it would obviously be desirable to set up a National Meteorological Centre, I am unable to recommend it during this rehabilitation period. We should focus all our efforts onto seeing that the Entebbe Meteorological Station is functional and well equipped to serve civil aviation needs, and that the various observatory stations around the country are working properly.

129. The needs of Soroti as a Regional Flying School should receive a sympathetic hearing for the same reasons as mentioned in the last paragraph.

130. Uganda should continue to receive weather messages and aeronautical forecasts from the Nairobi Regional Telecommunications Hub (RTH) for Africa.

131. Computer time should be hired from already existing centres in Uganda for batch processing of meteorological data.

132. A sound building construction programme both for stations and offices, as well as for staff housing is a vital pre-requisite for the task ahead. It is hoped that the building industry in the country will be able to accommodate this construction programme as well as many others which will be making demands on it.

133. As the service gradually recovers and confidence is restored, expansion should be based fundamentally on the throughput, i.e. flight documentations and the various enquiries handled. On the basis of performance, the project to set up a National Meteorological Centre should be reconsidered in June 1981.

External Assistance

134. The task of setting up a meteorological service from virtually nothing will require a great deal of new equipment and spares. All these will have to be imported. Government will find it difficult to raise both the local and foreign exchange inputs for this service industry.

135. Various aid agencies may therefore be approached and invited to share in the funding of this rehabilitation exercise. Loans that require servicing may be inadvisable for this 'non-productive' enterprise.

136. Clearly the Department will have to be expanded and upgraded. This means that extra staff (managerial, professional, technician and general) will have to be recruited. Expatriate personnel should be employed while the Department plans and executes a staff development programme geared to the task ahead.

137. In addition to the usual technical assistance channels, it is likely that the World Meteorological Organisation (WMO) and the International Civil Aviation Organisation (ICAO) will be willing to assist.

ANNEX 20.1

1979 War Damage to Uganda Posts and Telecommunications

Item	Location	Extent of Damage
Subscriber installation	Overall	70%
	Masaka	100%
	Mbarara	100%
Kampala network (exclude U/G cable)	Kampala	60% (?)
Exchange and their buildings	Masaka	100%
	Mbarara	"
	Lira	"
	Mityana	"
	Mpigi	"
	Kyotera	"
	Kalisizo	"
	Nabusanke	"
Maintenance workshop (include tools, equipment and stores)	All	60% (?)
Radio link stations	Sabwe (Mpigi)	60%
	Masaka	60%
	Mbarara	60%
Records (Accounts, Post Offices and Savings Banks)	Overall	40% (?)
Junction Cable and major o/h route	Overall	60%
	Kampala/Entebbe	80%
	Kampala/Bombo	80%
Vehicle Fleet	Overall	80%

ANNEX 20.2

Telecommunications Major Equipment, Services, Manpower and other facilities

Facility	By 1970	By 1979
Automatic exchanges	13	20
Manual exchanges	32	93
Electricity generating sets	8	37
Underground cable	na	na
Radio Routes		
Kampala - Masaka	48 ch.	48 ch.
Kampala - Junja - Nairobi	-	960
Jinja - Mbale	-	60
Kampala - Gulu	12	12
Kampala - Arua	3	15
Kampala - Arua (DOMSAT)	-	24
Kampala - Masindi	6	12
Kampala - Fort Portal	-	24
Kampala - Mwanza (Troposcatter)	48	48
Kampala - Kigali (UHF)	1	1
Single Channel Routes (UHF)	3	23
Arua - London (SATELLITE)	-	6
Telephone Physical Connections	26,785	52,186
Radio Bearer Trunks	na	na
Kampala Camier Room Trunk Test Board	1	1
Telecommunications Manpower		
Professional	9	22
Semi-professional	80	117
Technical	89	729

ANNEX 20.3

1979 War Damage to Radio Uganda

Facility	Location	Extent of Damage
Studios	Broadcasting House	10%
	Nakasero News Studios	10%
Workshops	Kampala	Looted
Outside Broadcasting and Mobile Recording Unit	Broadcasting House	?
Transmitting stations	Kabira Road (50+10 KW)	10%
	Bugolobi (SW + MW)	10%
	Mawagga (2x50 KW, MW)	Looting of tools, measuring equipment, furniture, vehicles
	Kabale (2x50 KW, MW)	"
	Soroti (2x250 KW, SW)	"
	Butebo (2x50 KW, MW)	"
	Bobi (2x50 KW, MW)	No report, but is off air
	Arua (Gilgil)	"
	Mbale	Long off the air
Link stations	Magejo	Totally destroyed
	Mbarara	"
	Dokolo	"
	Nakisajja	Equipment and tools looted
	Kisunji	No damage
	Omoru	No report
	Rwagazu	"
	Soroti and Butebo	Looted
Teleprinter network (news)	Fort Portal	No report
	Jinja	"
	Mbale	
	Gulu	
Naguru Central Receiving and monitoring station	Naguru	

Major Equipment, Services, Manpower and other Facilities

Facility	By 1970	By 1979
Nakasero studios (News)	1	5
Broadcasting house studios	13	20
Transmitting stations (SW)	1	2
Transmitting stations (MW)	na	9
Link station	9	9
Teleprinter Network station	2	5
Naguru Monitoring stations	1	1
Manpower		
Professional	na	na
Semi-professional	na	na
Technical	na	na

ANNEX 20.5

1979 War Damage to Uganda Television

Facility	Location	Extent of Damage
Studios (2 only)	Nakasero	Nil
Outside Broadcast Units	Mobile	Nil
Transmitting stations (VHF)	Kampala (Ch.5)	Nil
	Kabale (Ch.7)	Looted
	Mbarara (Ch.10)	Totally destroyed
	Jinja (Ch.11)	Looted of tools & small equipment
	Mbale (Ch.8)	"
	Soroti (Ch.10)	"
	Lira (Ch.7)	"
	Gulu (Ch.9)	"
	Arua (Ch.6)	"
	Masaka (Ch.8)	Totally destroyed
Relay stations	Nkirakira	No report
	Masaka	"
	Nakisajja	"
	Jinja	"
	Kagulu	"
	Ongora	"

ANNEX 20.6

TV: Major Equipment, Services, Manpower and Other Facilities

Facility	By 1970	By 1979
Studios	2	2
Colour VTR machine	Nil	1
Telecine	na	1
Colour cameras	Nil	Nil
Black and White cameras	na	7
Transmitting stations	na	10
Relay stations	na	6
Outside Broadcast Units		
Colour	Nil	2
Black and White	na	1
Manpower		
Professional	na	na
Semi-professional	na	na
Technicians	na	na
Others	na	na
Output		
Programme hours per week		
Penetration of service		

ANNEX 20.7

Major Equipment, Services, Manpower and other Facilities

Equipment/Services	By 1970	By 1979	Remarks
VHF transmitters (Tower) (Approach)	na	na	Entebbe & Soroti
VHF receivers (Tower) (Approach)	na	na	Entebbe & Soroti
Area cover repeater station	1	1 + 3	The three never commissioned
HF transmitters (CW)	2	2	Currently unserviceable
HF receivers (CW)	2	2	
HF transmitter (voice)	1	2	
HF receiver (voice)	1	2	
NDB	5	8	Only one OK
VOR/DME	1	1	No standby unreliable
Teleprinters (land line)	na	na	All down and obsolete
Terminal primary radar	na	1	Intermittently faulty
FIR	Nil	Nil	Needed after 1974
VDF	?	2	Both down
ILS	Nil	1	Not commissioned since 1975
Message channels (AFTN)	na	6	
Output			
Aircraft movements	59463	31535	EBB + Soroti
Passenger handled	316800	?	
Freight (Tonnes)	3600	?	
Messages (aircraft + met)	43197	25211	

ANNEX 20.8

Meteorological Services Major Equipment, Services, Manpower and other Facilities

Facility	By 1970	By 1979	Remarks
National Meteorological Centre (NMC)	1	Nil	Was in Nairobi
including the following: Landline terminals linking E.A. Forecast offices automatic RTT receiver			
Tie line between Entebbe Observatory and Control Tower	1	Nil	Badly needed
Entebbe Observatory	1	1	
Weather radar	1	1	Now unservicable since 197-
Weather satellite ground station	1	1	"
HF communications receivers	2	2	"
SSB transreceivers	5	5	"
Hydrogen generator	1	1	Unrepairable
Observatory out-station/offices	na	11	
Upper air station (radio sonde)	na	1	Unserviceable
Data processing equipment	yes	Nil	Was in Nairobi
Manpower			
WMO Class I Meteorologist	2	10	
" Class II "	10	16	
" Class III "	-	-	
" Class IV "	120	170	
Telecommunication engineers	Nil	1	
Technical staff	12	6	Severely under-staffed
Output			
Observations per day per observatory station	18	na	
Flight documentations per month	200	na	
Public weather forecasts per day	2	na	
Various enquiries per month	200	na	