

# ***Development of Telecommunications Infrastructure in Africa: Network Evolution, Present Status and Future Development***

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## **ABSTRACT**

This article reviews critically the evolution, present status and future development of telecommunications in the African continent. It reports the major efforts so far made to develop telecommunications technology and services in Africa and points out that despite all these efforts, it is a painful fact that Africa still lags behind in the development of communications.

The article attributes this unfortunate situation mainly to economic resource constraints, inefficient planning, inadequate roads, lack of coordination and low priority of communication development. It then calls for greater cooperation among African countries, funding agencies, the United Nations and the industrialized countries in this crucial area of telecommunications development in Africa, for the mutual benefit of all.

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## **Développement des infrastructures de telecommunications en Afrique: évolution du réseau, état actuel et perspectives**

### **RESUME**

Cet article fait une étude critique de l'évolution, de l'état actuel et des perspectives de développement des télécommunications en Afrique. Il rend compte des efforts importants faits à ce jour pour développer les sources et les technologies de télécommunications en Afrique et fait ressortir que, malgré tous ces efforts, l'Afrique accuse encore un grand retard dans le développement des communications.

Selon l'auteur, cette situation malheureuse est due principalement aux difficultés économiques, à une planification inefficace, au manque de routes, à l'absence de coordination et au bas niveau de priorité accordé au développement des communications. Il lance un appel en vue d'une plus grande coopération entre les pays africains, les agences de financement, les Nations - Unies et les pays industrialisés dans le domaine crucial du développement des télécommunications en Afrique, dans l'intérêt de tous.



### **Background:**

Basic conventional telecommunications was first used in Africa during the pre-independence era by trading firms in West Africa. It is also believed that similar communication was available in Eastern Africa, around the same period. In Eastern Africa, a legal creation of a postal and telecommunication entity was made in 1893. In general it should be pointed out that major development activities in this field started in Africa in the 1960s.

These major changes we are now witnessing could not have been realized without technical and financial assistance from international and regional organizations such as the OAU, ITU, the World Bank, UNDP, ECA, ADB, and similar bodies.

### **Pan-African Telecommunication Network (PANAFTEL)**

One of the first international organizations to initiate action on Pan-African Telecommunications Network was ITU. The International Telecommunication Union (ITU) organized a conference of African Postal and Telecommunications Administrations at Dakar, Senegal, in 1962, during which the first international plan for the development of an African Telecommunications Network was outlined. This plan was subsequently reviewed at other meetings culminating in the 1965/70 Addis Ababa Plan which gave detailed appraisal of the African Telecommunications Network.

The Economic Commission for Africa (ECA) had also its share of contribution in fostering telecommunications as a tool for socio-economic development during those early years.

of independence for many African countries. In 1966, ECA and OAU held a joint meeting on Telecommunications in Africa in which telecommunications a a sector was reviewed. During the meeting, governments were requested to take immediate action to develop their telecommunications infrastructure in consultation with other bodies such as ECA and ITU. The other important point emphasized in this recommendation was the need to develop manpower for organization, installation and maintenance of these networks.

In 1967, the ECA at its eighth session, adopted a resolution on Pan-African Telecommunications Network, in which among other things, African governments were invited to give the development of an African Telecommunications Network very high priority in their development plans. To this end, the Secretary-General of the ITU and the Executive Secretary of the ECA submitted a request to the UNDP for funds to finance the preliminary work of collecting the information necessary to define the assistance required for the entire project. The Council of Ministers of the Organization of African Unity, at its thirteenth ordinary session, meeting at Addis Ababa in September 1969, further endorsed the setting up of a modern and efficient Pan-African Telecommunications Network.

The ITU, as the executive agency, under the United Nations Development Programme, started detailed surveys in 1968 in Africa, initially with 28 African countries participating in the surveys and studies conducted by the ITU experts and ITU-managed consultants.

In 1972, the ITU and the UNDP in collaboration with the ECA and ADB organized a meeting in Addis Ababa to discuss the general plans for a Pan-African Network. The total investment required to realize the project was estimated at approximately US\$140 million for the establishment of a network equivalent to 20,000 km. The detailed pre-investment survey covering the transmission routes and 18 international switching centres was completed in 1973. The financing of this project was undertaken through bilateral or multilateral arrangements, through major international or regional financial institutions such as the World Bank and the African Development Bank.

According to the ITU report submitted at the 3rd African Telecommunications Conference in 1981, by the end of 1979



there were 20 international telex switching centres in service in Africa supported by approximately 30,000 route-kilometres of high quality transmission routes consisting of radio-relay and coaxial cable systems. In addition, there was a 4,000 km submarine cable in the North-Western part of Africa. As a complementary, there were 38 satellite earth stations providing both international and inter-African service. There were also four countries with leased transponders for domestic use. However, there was a total of 9539 km of routes already surveyed but awaiting implementation. In addition, there were 8195 km of routes awaiting survey.

### **African Sub-Regional Telecommunication Conferences**

In order to coordinate effectively problems related to planning and management of telecommunications, it was found necessary to create sub-regional meetings. In East Africa, these meetings have existed since the 1960s and because of their success, immense support has been received from both international and regional organizations. These sub-regional conferences are held on an annual basis to review plans and operation of services which include routing, signalling, maintenance and training requirements.

There are four sub-regions: East and Southern Africa; Central Africa; North Africa and West Africa.

### **United Nations Transport and Communications Decade for Africa**

Despite all these efforts, it is a painful fact that Africa still lags behind in the development of telecommunications infrastructure mainly due to resources constraints. According to World Telephone Statistics, as of January 1987, telephone penetration in Africa was only 1.4 per 100 population as compared to 4.5 in South America or 5.2 in Asia. Data obtained from about 50 African countries show that the entire network of 10 of these countries was below 5,000 telephones, more than half the countries had less than 20,000 telephones and in only 8 countries did the total exceed 100,000. The average penetration of telephones was only 0.66 per 100 population, the density ranging from 0.1 to 8.96. This state of

affairs was, and is still more serious in rural areas. In most rural areas of Africa, there are no telephone facilities at all or if they exist, they are inadequate and of poor quality.

In response to this, the United Nations General Assembly at its 32nd session in March 1978, adopted a resolution, No.32/160, declaring the years 1978/87 the Transport and Communications Decade in Africa. This resolution was to draw the attention of the world community on the need for rapid development of transport and communications in Africa with ECA designated as the Executing Agency. In a further development, the Assembly of Heads of State and Government of the Organization of African Unity meeting in its 2nd Extraordinary Session in April, 1980, Lagos, adopted the Lagos Plan of Action which incorporated the Transport and Communications Sector, the relevant resolution having been earlier adopted by the OAU Assembly of Heads of State and Government in Monrovia in July 1979. The communication projects incorporated in the Lagos Plan of Action included telecommunications, broadcasting, postal, manpower development and communications by satellite. All these events were indicative of a realization by African governments and the world at large on the dire need to develop a sound and efficient telecommunications infrastructure for socio-economic development on this continent.

The Communications Sector, within the meaning of the United Nations Transport and Communications Decade in Africa Programme, is made up of telecommunications (telephone, telex and telephone-derived communications), broadcasting radio and television and other derived services, and postal services.

The Communications Sector Programme of the Decade can be said to have been designed to help coordinate the development of communications systems and supporting institutions in the member countries. The Sector Programme lays emphasis on:

- (a) upgrading and expansion of national networks;
- (b) development of communication capabilities and rural communications;
- (c) rapid expansion of communications skills and manpower development institutions;



- (d) appropriate exploitation of the new communication technologies for national and inter-regional communications, and continuing expansion of the terrestrial communication network project (Plan-African Telecommunications Network - PANAFTTEL);
- (e) promoting the establishment of telecommunication, broadcasting and postal equipment manufacturing facilities.

Certain specific targets have been set for the Decade in terms of the penetration of communication services. In the common-carrier sub-sector the tentative objective is to achieve an average density of penetration of one telephone per 100 of the population as against the current world average of 14.7. The objective for the broadcasting sub-sector is to achieve full sound broadcast coverage for each country, and an increase of sound broadcasting receiver penetration from the present seven to 20 sets per 100 of the population. In the postal sub-sector the target is one post office to serve 3,000 to 6,000 inhabitants. These three principal sub-sectors were selected for special attention because of the perceived needs of member countries of the Commission and their potential contributory factors to development.

The political will to develop telecommunications is apparent in the developed and developing economies. The problem of telecommunication development in the developing economies is on the one hand limited resources vis-a-vis the various priorities demanding urgent solution, and on the other hand the burden of international indebtedness and the increasing protectionism worldwide with the associated impact on the transfer of appropriate technology. As we all know, the demand for telecommunications in the developing economies of Africa is there. We also know of the abundant supply capacity of the developed and some of the developing economies. However, the mutually beneficial arrangements acceptable to both sides have still to be created. In Africa, each country has its own specific problems. However, some common constraints to the development of the communications infra-structure can be identified:

Most African countries have established their basic national telecommunications networks. These networks are small and concentrated in the urban areas and continue to

provide the ever increasing demand for telephone, telex, radio, television and other services. International and some of the intra-African traffic are provided by satellite earth stations. Rural areas in Africa remain especially poorly served, and with some exceptions, are given low priority by national telecommunication administrations. The low initial revenue potential of rural services is in part responsible for the second place accorded them in relation to the construction of urban, inter-urban and international circuits.

In operations these services are sometimes inefficient, slow and very expensive. The availability of these services are also inadequate. Alternatively, the International services operating within the same network are faster and often of better quality. In spite of the progress made in the provisions of the (Pan-African Telecommunications Networks), it is still limited in scope. The utilization of the Net work by its potential users (radio broadcast, television services, aeronautical and meteorological services and press and news agencies, etc) is disturbingly very low. The low utilization of the system is in part due to operations difficulties, poor maintenance, in some cases high tariffs, absence of operational agreements, shortage of trained manpower, spare parts, shortages and poor management as well as the need for upgrading some of the earlier installations, utilization of new technologies and inter-connection to other sub-regional section of the PANAFTTEL Network.

These services represent considerable improvement since the inception of the UNTACDA programme five years ago, but the rate of development still lags behind UNTACDA targets in most areas. The continent of Africa still lags seriously behind world standard in the allocation of funds to communications projects. Its communications facilities as described above also lag behind by comparison with other regions of the developing world. With more than 11.4 per cent of the world population, Africa has fewer than 0.7 percent of its telephone. The number of telephones as a proportion of the population, approximately 6.6 percent in Africa, compares for example with a figure of 6 percent in Latin America. Broadcasting penetration in /Africa, too, remains far below world levels. Although the African continent accounts for 23 percent of the world land mass, it hosts only 3 percent of the world's



television and radio transmitters. The numbers of sound receivers per 1,000 inhabitants in Africa is one fifth the world average while the number of television receivers, at 7 per 1,000 inhabitants, compares poorly to a world figure of 123.

Finally, inadequate roads and lack of co-ordination between the various subregions, coupled with insufficient facilities, make African postal network fragmented, often slow and inadequate. This may be attributed to the low priority often according to communications infrastructural development in most national plans. Mainly because electronic communications systems (telecom-munications and broadcasting) are capital intensive and it is felt by national planners that the allocation of scarce resources to this sector may jeopardize investments in other vital sectors such as health, agriculture, industry, transport or education. This stance can often be rigid and ignores the contribution of communications to the efficient management of these activities as well as the fact that contrary to general belief telecommunications precede and is a cause of development.

The difficult and, in certain cases, critical economic situation of many African countries has not facilitated adequate resource allocation to the communication, (which largely imports most of its material inputs. Generally, the amount of resources allocated to the communication sector is determined by the quantum of direct financial profits generated by the investment and to a large extent fails to take due account of the sector's contribution to the development of the other sectors of the national economy or to the social benefits, largely unquantifiable, it generates from the allocated resources.

Absence of or inefficient planning communications services invariable leads to poor performance, waste of capital investments and humans resources. In addition national planning authorities have often given this sector low priority in the context of national needs because of the absence of matter plans to guide national communications development programmes.

For member countries of the Commission, there is a double challenge for communication services expansion to keep up with increasing demand in consonance with the pace of development while also planning for an investing in network extensions to unserved press and remote rural

communities in order to speed up the pace. This latter challenge poses a magnitude in volume of expansion requirement far in excess of what the developing countries face. Consequently, communications development issues, are being considered as an inseparable part of the overall development policy of each country.

In practical terms this means government decisions on the development of the sector as a whole are being linked with decisions on many other national issues such as on rural development, on increased industrial and agricultural production, on intra-regional and international trade production and a host of other national and regional objectives.

### **Future Development: The Rascom Project**

The specific targets of UNTACDA were to achieve a telephone density of 1.0 per 100 inhabitants in the urban areas and one public call office (PCO) per 10,000 inhabitants in the rural areas, with each inhabitant within 5 km of a telephone. These targets have been put back to the year 2000 as growth rates have been lower than expected. The following obstacles have hampered progress:

- telecommunications not being accorded adequate priority
- a lack of common standards
- related power supply problems
- use of equipment not adapted to the African environment and requirements
- a lack of "telecommunication operation agreements" between administrations
- unharmonized tariff rates
- fast-changing technology
- inadequate high-level manpower for technical and administrative management
- a scarcity of financial resources
- a lack of industries and manufacturing capability.

These obstacles forced African countries to rethink their approach to the continent's telecommunications problems. After the instigation of PANAFTEL, many African nations became eager to exploit the potential of the most recent



technological developments - particularly those suited to the rural applications that are their prime concern. Satellite communications technology is of particular interest.

In response, a number of organizations initiated pre-feasibility studies known under various names. The proliferation of studies and the attendant waste of human and financial resources led to the establishment of the Inter-Agency Co-ordination Committee (IACC) of the Regional African Satellite Communication System for the Development of Africa (RASCOM) by the Conference of African Ministers of Transport, Communications, and Planning.

The IACC is composed of the Organization of African Unity (OAU) Chairman, the Economic Commission for Africa (ECA) Vice Chairman, the African Development Bank (ADB), the Chairman of Civil Aviation Commission (AFCAC), the International Telecommunication Union (ITU), the Pan African Telecommunications Union (PATU), the African Posts and Telecommunications Union (UAPT), the United Nations Development Programme (UNDP), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the Union des Radiodiffusions et Televisions Nationales d'Afrique (URTNA).

The Conference of African Ministers of Transport and Communications, and Planning resolves to undertake a comprehensive, objective study of an integrated telecommunication network for Africa. The study is to take account of the need to provide a satisfactory service, particularly to the rural areas, in order to enhance the socio-economic development of the participating countries. In its 1983 Cairo Resolution (ECA/UNTACDA/RS.83/26) the ministers asked the IACC to integrate all the pre-feasibility studies into this single project, which it was then to supervise and monitor.

The ultimate development goal of the project and economical means of the telecommunications, including sound and television broadcasting and community reception by satellite are in African countries using a region African satellite system. This system is to be complemented, as necessary, by any other appropriate technology, and has to be properly integrated into the existing and/or planned national network.

Having thus defined the ultimate goal of the project, the following Terms of Reference stipulated the immediate objectives of the study:

- to undertake technical and economic studies for the design, launching, and operation of a regional dedicated satellite system for the African region that would cater for the provision of efficient and economical telecommunications, including broadcasting and data communications for national and international links, both urban and rural.
- to cover all aspects of the integration of the space component into the existing or planned network.
- to identify and prepare a broad outline of specifications for the design and local production, where possible, of all types of equipment required, geared to the African economic, social, technical and physical environments.

### **Organizational Structure**

The supreme authority for the project is the Conference of Ministers of Transport, Communication, and Planning assisted by an Interim Executive Committee (IEC). The IEC will consist of one representative from each African country participating in the project. Collectively, the members of the IEC have to direct the activities of the project, to study the various reports, and submit recommendations to the Conference of Ministers. The IACC will submit reports and recommendations to the Conference of Ministers via the IEC.

A project office was established in March, 1987 at the ITU headquarters in Geneva to undertake parts of the study and to ensure its day-to-day follow-up. This office is manned by a small team of international experts, headed by a project director and recruited by the ITU on the recommendation of the IACC. The ITU provides the project staff with support facilities within the UNDP structure all over the African continent, as well as resources such as computer facilities from its headquarters. In addition, the experts benefit from the current privileges and immunities that are accorded to staff in the United Nations system for technical co-operation.

This office is responsible for the supervision of field work. It will compile and analyze reports from field and draw up a



comprehensive report representing all telecommunications options to the authorities for their final decision on the implementation phase. The supervising agencies are those institutions that are directly associated with the practical execution of the project (i.e. ITU, ECA, PATU, UAPT and URTNA). These agencies will play an active role in the project, particularly on a national level.

As the heads of state of the Union Douaniere et Economique de l'Afrique Centrale (UDEAC) countries have mandated the secretary General of UDEAC to undertake a study of a sub-regional satellite communication system, and the ministers of each subregion have decided to continue their association with RASCOM, the IACC has decided to associate UDEAC with the supervising activities of the RASCOM Project.

### **National-Level Activities**

The primary activity is to identify truly development-oriented telecommunication service needs in each country. The study will approach the problem of access to telecommunication services, not just from the conventional telephone/telex demand as perceived by the PTT authority, but also as felt by the overall national development authority in the form of infrastructural support to other activities. This will bring to the study the cultural, economic and social breadth that it needs to satisfy the aspirations of the population of each country.

In order to achieve this objective, multi-disciplinary National Co-ordination Committee (NCCs) have been established with the PTT as a focal point. A national coordinator has been named in each African country to ensure effective follow-up at the national level and to act as a contact for relations with regional activities of the Project. Considering the importance of national-level activities in the RASCOM feasibility study, the project office has prepared as its first priority a document entitled "Guidelines for Conducting the National-Level Feasibility Study of a Regional African satellite Communication System for the development of Africa". Its purpose is to aid the NCCs in the preparation of national feasibility studies.

The results of the national-level activities will be documented in national feasibility study reports covering all

4. **Appropriate Modern Telecommunication Technology for Integrated Rural Development in Africa (AMTT/IRD, ITU, Geneva, Nov. 1981).**
5. **Richard L Nickelsen, Appropriate Satellite Systems for Rural Telecommunications, IEEE, 1982.**
6. **Interim Progress Report on RASCOM PROJECT: Kenya National Coordinating Committee, KP&TC.**
7. **Report of the Third African Telecommunications Conference, Monrovia, Liberia, 1981.**