The Beginnings of Radio Habana Cuba

by José Altshuler, Dr.Sc.*

The first decade of the 20th century saw the installation and regular operation of the first radio communication stations in Cuba, using *De Forest* and *Telefunken* low- and medium-frequency spark transmitters to provide wireless telegraphy services, essentially ship-shore. By 1916, in the context of World War I, the Cuban government equipped its station at the entrance of the bay of Havana with a 20 kW transmitter so that it could reach "the United States and [...] any ship 500 miles or more from the island" [5].

Radio broadcasting began in 1922, initially in an amateurish way, and shortly after with a 500 watt medium-wave transmitter installed and operated in Havana by *ITT* through its subsidiary, the *Cuban Telephone Company*. Erected with a view to enhancing the corporate image of *ITT*, the facility was one of the nine most powerful ones in the Western hemisphere at the time [6]. Commercial broadcasting expanded rapidly from 29 medium-wave stations operating in 1923 to 81 in 1935, when the number of radio receivers in the country was about 45 000 [3].

By the end of 1933, the first shortwave commercial broadcasting station was installed. A few other low-power shortwave transmitters went into regular operation afterwards for the purpose of serving the interior of the country, but they were not effective enough and most of them were put off after some time. Only a few low-power shortwave broadcasting stations remained in operation in Cuba in the 1950s, each one dedicated to the simultaneous transmission of the ordinary commercial programs broadcast by associated medium-wave stations serving a national audience. As for international point-to-point shortwave radio communications services, practically all of them were in the hands of private companies. The most important ones belonged to *ITT*.

A modest but effective shortwave radio communication network was set up in 1958 between the Cuban guerrillas that fought against the bloody dictatorship in power since 1952 and various radio amateur stations in the country and abroad. The first and most important guerrilla station was *Radio Rebelde*, at the Sierra Maestra mountains, whose programs greatly influenced the country's public opinion at the time. In a certain way, this announced in more than one sense the radically different development the country's radio communications were to undergo before long [8, 9].

The main avowed purpose of the revolutionary government established in Cuba early in 1959 was to accomplish deep social, economic and political changes in the country's best interests in general and those of the needy in particular. As the events that followed led to more and more radical measures which affected important corporate interests, both national and transnational, the new administration realized that the country must have—as soon as possible—its own international shortwave radio communication means, including broadcasting. This was seen as an important way to avoid complete informational isolation by powerful unfriendly interests, especially in case of a foreign military attack [4], a point of

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view akin to the one prevailing at the close of World War I among high ranking government officials in the United States who believed that "foreign ownership of any part of American telecommunications would prove dangerous in any future war [19]."

The Ministry of Communications—its Telecommunications Advisory Council in particular—was responsible for the bulk of the initiatives that brought into being, in record time, the powerful shortwave transmitting center and associated receiving center required. The following provides a broad outline of how this was accomplished, including some of the important changes it prompted in the university teaching of electronics and telecommunications.

Technical Support

The revolutionary administration that took charge of the country's Ministry of Communications early in 1959 devoted itself to the task or transforming the huge bureaucratic office at the service of petty politics the ministry used to be into a technically oriented institution worthy of the name.

At the beginning, while essentially preserving the original organization in order to avoid disrupting the ordinary public services then provided, the newly appointed Minister created a Telecommunications Advisory Council, labeled *Consejo Asesor de Telecomunicaciones* and ordinarily referred to thereafter by its acronym, *C.A.T.* Staffed mainly by a small number of electrical engineers and technicians, and a larger number of enthusiastic electrical engineering students, its original purpose was to collaborate closely with the Ministry's technical vice minister in drawing up whatever technical proposals were required.

The Telecommunications Advisory Council immediately devoted itself to carrying out several studies with a view to updating the country's notoriously obsolete telegraph system, establishing a national telex system, and building an effective ship-shore radio communications network. However, its first priority was to promote the initiative of setting up two modern and efficient international shortwave radio communications services (point-to-point and broadcasting), whose design and implementation by the Ministry of Communications would be taken care of by its staff until brought to fruition.

To begin with, preliminary calculations were made of the transmitter powers, working frequencies and antennas required to establish reliable radio communications between Cuba and different areas abroad [10, 11]. Also, an azimuthal equidistant map centered in Havana was carefully drawn to help designing a suitable antenna field [18].

Contacts with appropriate manufacturing firms and evaluation of their eventual proposals were put in the hands of *C.A.T.* personnel, who engaged in technical and other related discussions with various possible suppliers of high repute in their respective fields. Two of them, *Telefunken*, from West Germany, and *Brown Boveri* from Switzerland, claimed they were able to deliver immediately one 100-kW shortwave transmitter. Members of the Cuban delegation to the International Telecommunication Union conference which was then taking place in Geneva were able to personally verify the claim by the Swiss firm. Apparently, the equipment it offered had been specially manufactured for the Ethiopian government, who had backed off its original intention for financial reasons.

On November 10, 1959, the *C.A.T.* issued the first part of a preliminary report on the installation of a shortwave transmitting station in Havana [12], which emphasized the urgent need to seize the opportunity and acquire at least one high power transmitter to provide an effective broadcasting service, plus additional equipment to establish reliable point-to-point communications links with Mexico, Venezuela and other countries, if possible. A proposal was made that the transmitter building and antenna field be erected near the town of Bauta, on a plot of land some 25 km distant from the main building of the Ministry of Communications in Havana, which was accessed by fairly good roads and by electric power supply lines from two different substations. It was also claimed that, if powerful enough, the new radio broadcasting service would give the nation the ability not only to spread the achievements and goals of the revolutionary process taking place at home, but also to "rapidly inform listeners abroad, particularly Cuban diplomatic personnel overseas, of any important events that might possibly arise in our country, and be systematically distorted by foreign news agencies [12]." This turned out to be quite accurate, especially during the failed 1961 Bay of Pigs invasion and the 1962 missile crisis.

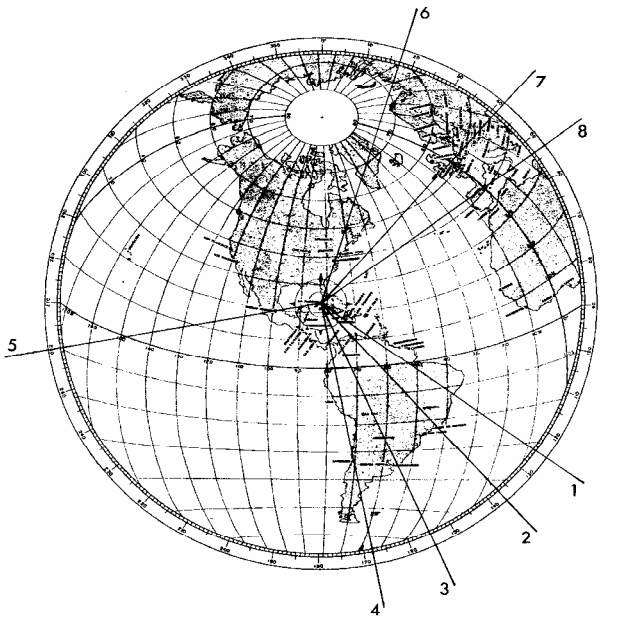

Figure 1. *Rhombic antenna azimuths for the Bauta transmitting station (1961).*

Parts II [13] and III [14] of the above mentioned report followed quickly, with a proposal for the orientations of eight rhombic antennas for the transmission of radio signals toward various areas of interest, and tentative timetables for overseas broadcasting. Fig. 1 shows the azimuths of the rhombic antennas erected [16].

To secure the required government approval and funding, the Minister of Communications took the above proposals to the cabinet, where he had to fight the opposition by some who objected that very few people would take the trouble to listen to shortwave radio broadcasting. But in the end, the merits of the proposals were not only accepted in principle but required to be implemented more fully as well.

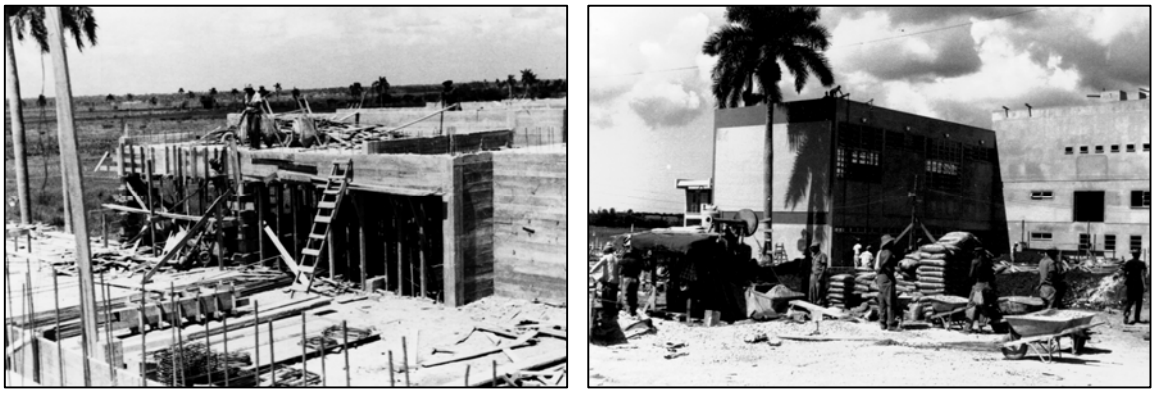

***Figure 2**. Early stages in the construction of the main building for the Bauta transmitting center.*

As a result, by the end of June, 1960, contracts were signed with five well-known European manufacturing firms: *Brown, Boveri & Co*., *N.V. Philips Telecommunicatie Ind*., *Marconi's Wireless Telegraph Co*., *Siemens & Halske AG*, and *Davey Paxman & Co*. [2, 16]. Soon after, the *C.A.T.* became the *Engineering Section* of the Ministry's newly created *Dirección de Telecomunicaciones* (Directorship of Telecommunications).

Provisional Set-up

Two 100-kW and two 10-kW AM shortwave transmitters plus the metal parts required to erect the transmitting antenna field, suitable power transformers, and various accessories were acquired from *Brown Boveri* according to the contract signed with the Swiss firm in February 1960. One of the 10-kW units was rigged up in a 16-square-meter hut near the place where the main building for the transmitting center was under construction (Fig. 2), and connected to an improvised rhombic antenna pointed at Caracas, Venezuela. This installation was used to carry out a short cycle of experimental broadcasting on 11 760 kHz, inaugurated on July 26, 1960. Ten weeks earlier, a 50-kW high-power medium-wave radio station installed in Swan Island, in the Gulf of Honduras, had started broadcasting towards Cuba an aggressive disinformation and subversive propaganda campaign, covertly operated by the CIA [17, 20].

At the end of October, 1960, the main building for the station was ready to lodge the bulk of the equipment that had been stored elsewhere during the previous five months. Installation of the first 100-kW transmitter was then taken up by Cuban personnel under the supervision of a senior expert from the *Brown Boveri* company, and completed in about four months (Fig. 3). Experimental broadcasting with this transmitter started around the middle of March, 1961. It was tuned to 6 076 kHz and made to feed a provisional antenna consisting of a folded dipole with 340º-160º maximum-radiation azimuth, which was capable of covering important areas of the Western hemisphere reasonably well [16].

On April 15, 1961, foreign B-26 bombers painted as if they belonged to the Cuban Revolutionary Air Force, bombed airfields in Havana and Santiago de Cuba by surprise, killing nine people. This was immediately chorused by the international media as an attack

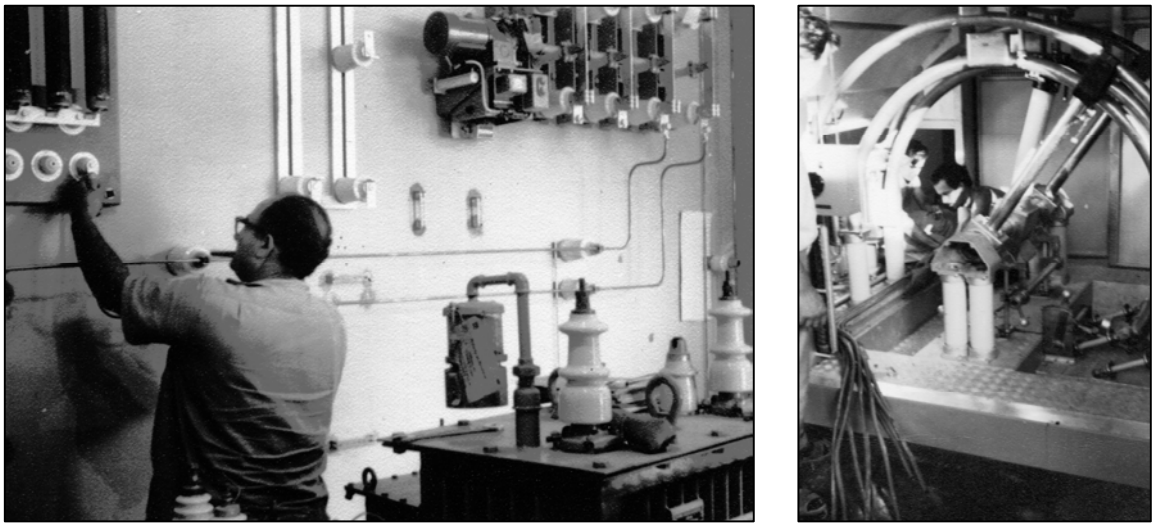

Figure 3. *Installing the first 100 kW shortwave transmitter for Radio Habana Cuba at the Bauta transmitting center (1960).*

by defectors from the Cuban revolutionary army. The next day, Fidel Castro exposed the untruthfulness of this allegation in his address to the thousands of members of the national armed forces and militiamen who attended the victims' funeral. Among other things, he remarked that for the first time the country could rely on its new radio facility to fight foreign media disinformation, so that lots of people abroad could now directly access reliable information supplied by Cuba. The spectacular confirmation of this by the defeat in less than 72 hours of the then impending invasion, and the later acknowledgment of the responsibility for it by the U.S. President, became a credibility asset for the subsequent launching of *Radio Habana Cuba*.

Combining Shortwave Broadcasting and Point-to-Point Communications

Radio Habana Cuba officially was inaugurated on May Day, 1961. By the end of the year, the planned installation of the Bauta shortwave transmitting center was nearly complete, after overcoming quite a few difficulties, among them the loss of several pieces of equipment that were confiscated by the American authorities when the ship that transported them to Cuba stopped over in Miami.

The antenna field extended over 130 hectares. It included 8 rhombic antennas having an average gain of 15 db with reference to a half wave dipole in the same frequency ranges (4 to 12 MHz and 12 to 30 MHz), with the main lobes of their radiation patterns positioned as indicated in Fig. 1. Two arrays with cardioid radiation patterns so oriented as to cover de Caribbean area shared the field with the rhombic antennas and the provisional dipole previously mentioned.

The building, conveniently located at a high point in the area to avoid being flooded during the rainy season, harbored the four *Brown Boveri* AM transmitters mentioned above, and three *Siemens* independent-sideband transmitters, one 20/30 kW and two 10 kW.

A switching system was installed indoors to make it possible to connect each transmitter to any antenna of a predetermined group. It was operated from a desk in the main hall of the building which included a protection system to prevent incorrect operations.

Specialized channels between the transmitting center and the Ministry of Communications were provided by a *Marcon*i multi-channel UHF link, while two *Brown Boveri* UHF links were used for receiving from *Radio Progreso* studios, in Havana, the programs to be broadcast. A small emergency studio, furnished with *Philips* equipment for audio work, was set up to make sure that shortwave radio broadcasting could carry on should the center be totally isolated from the capital. A 625 kVA diesel emergency-power-plant was installed to palliate eventual electric power failures. Supervision and shielded laboratory rooms were also set up for equipment monitoring, checking, testing, and repairing. Broadcasting to central Europe was inaugurated on October 24, 1961[16].

Needless to say, a full fledged shortwave receiving center had to be built for working in conjunction with the appropriate Bauta transmitters and establishing truly professional point-to-point communications with different overseas stations. Erected at a place called La Chorrera, some 5 km from the Ministry of Communications' main building, it harbored 11 *Marconi* professional receivers, and its antenna field included 9 rhombic antennas, mostly in double space diversity operation, plus an inclined "V" antenna and a biconic omnidirectional one. A *Marconi* UHF link for 11 telephone channels, 12 telegraph channels, and one service channel, all in duplicate, connected the receiving center with the Ministry, in addition to a telephone cable and a microwave link [16].

The receiving center was conceived not only as an essential component of the overseas point-to-point radio links, but also for general monitoring purposes, and later on, for radio location.

Point-to-point radio communication was inaugurated with Prague on May 9, 1961, and a similar service followed soon after in partnership with the Soviet Union [15]. Similar services with the United States continued to be handled by the older companies. *Prensa Latina*, the newly founded Cuban international press agency, developed its own transmitting and receiving facilities with Chinese- and US-made equipment, and established shortwave press circuits with offices in various countries.

Impact on Engineering Training

Considerable experience had been accumulated in Cuba before 1959 regarding the commercial programming of nationwide radio broadcasting, but none at all regarding international broadcasting, so that when the opportunity arose, the *C.A.T.* invited a *BBC* specialist to come to Havana and enlighten the appropriate personnel on the special characteristics of international broadcasting, which he did [2].

The above, however, was only incidental to the task taken up by the *C.A.T.* of creating suitable conditions for the training of engineers and technicians able to take care of the technical operation and maintenance of shortwave broadcasting and point-to-point communications equipment.

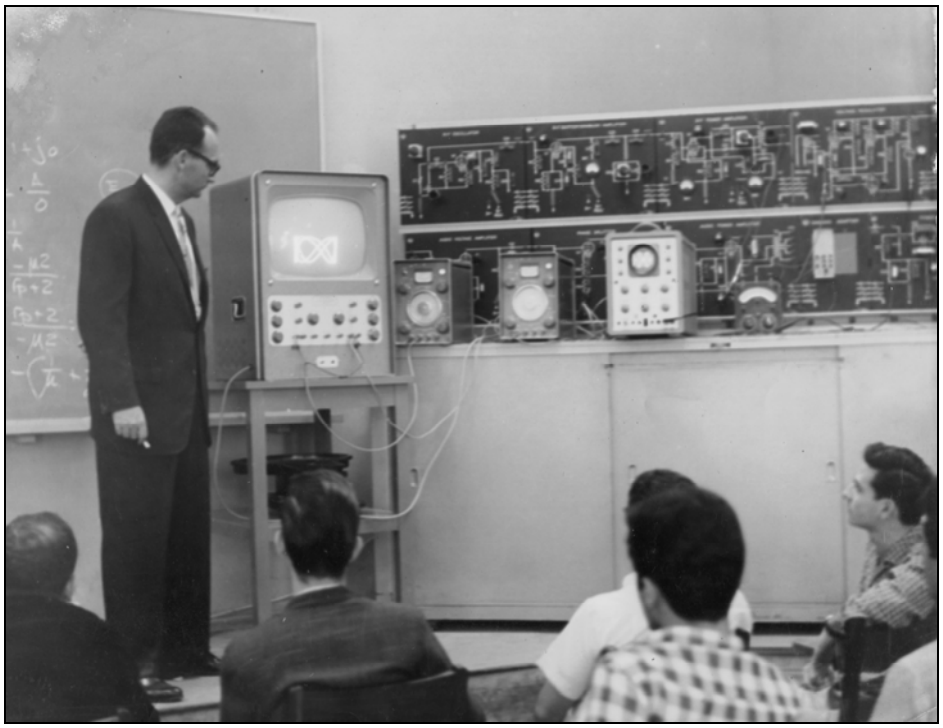

Figure 4. *A lecture on electronics delivered to electrical engineering students at the University of Havana (1962).*

For a start, the *C.A.T.* set up from scratch a specialized technical library at the Ministry of Communication which, by the middle of 1960, already held nearly 1 500 volumes and several complete collections of important technical journals [2]. In addition, some relevant introductory material on shortwave communications was produced to help update those members of its personnel still unfamiliar with the subject [1].

Some of the senior members of the *C.A.T.* soon engaged in discussions at the University of Havana with a view to promote the incorporation of full-fledged electronics and telecommunications studies to the Electrical Engineering degree courses then taught, to be implemented with the part-time enrollment of some of the senior members of its personnel as teachers for the new courses. Eventually, this came to fruition, helped by a substantial assortment of brand new laboratory and demonstration equipment donated by the Ministry of Communications to the Faculty of Technology of the University of Havana for the teaching of electronics and telecommunications (Fig. 4). It was finally decided that the new Electrical Engineering degree course would be made to consist of a basic bloc extending over the first three years, and two specializations: Electronics & Telecommunications, and Power, extending over the final two years [7].

Conclusion

The revolutionary government established in Cuba early in 1959 soon realized that the country must have some publicly owned radio communications means capable of directly delivering a message overseas. In less than two years time a modern shortwave transmitting

center was set up near Havana. It comprised a sizable directional antenna field, four transmitters for overseas broadcasting, and another three for point-to-point communications. A separate receiving and monitoring center was also built. Prompted by its own prospective need for trained personnel, the Ministry of Communications sponsored, in 1960-1961, the inclusion of a full-fledged electronics and telecommunications specialization within the Electrical Engineering curriculum then taught at the University of Havana.

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