

HEALTHNET VS. HF PACKET IN MOZAMBIQUE

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attempt at implementation contrasted with one that was successful.

CONCLUSIONS

WHY HF PACKET MAY HAVE FAILED	WHY HEALTHNET MAY HAVE SUCCEEDED
The concept was unknown in Mozambique	The Ministry of Health was aware of both the concept and of Satel Life.
No Mozambican of high enough level was involved to assist with Telecommunications and customs problems.	We had three men at Assistant Ministerial level to help with TDM and customs difficulties.
My limited HF experience and how sensitive it was compared to VHF I was used to working.	An expert was on site to do the satellite station installation and integration.
My lack of understanding how one obtains money/purchases from CARE headquarters.	The equipment was a donation and free (providing we could import it without charge).
Not knowing the custom detail of importing electronics from Canada to the United States.	Having a man on CARE staff who understood local import; regulations and procedures.
At least two separate and distant stations were needed to test but there was only <u>one</u> qualified person available to do so.	Only one station required.

CONCLUSIONS (CONTINUED)

HF	HEALTHNET
Antenna configuration of dipoles was not optimum for HF.	No problems arose with the omnidirectionals.
There was no money incentive.	There would be a huge savings in international communications.
Telephone land lines improved the last 18 months of the project so the BBS emerged as a usable substitute.	The BBS would augment and expand the station's reach up-country.
No locals confident enough with either radios or computers to want to learn the operation and system.	Several computer literate and interested doctors from the medical school,
Not enough free time to devote to the tests and training required.	Adequate free time plus a very personal interest.

HF PACKET RADIO PROJECT: MARCH 1987 -- APRIL 1991

I joined the CARE mission in Mozambique, Southern Africa in January, 1987. A nation-wide food distribution project was in process in that big, long country -- much of which was inaccessible due to the civil war in progress. CARE was the logistics branch of the government of Mozambique's Department for the Prevention of Natural Calamities (DPCCN). The telephone system in the nation had rapidly deteriorated since the 1975 revolution displaced the Portuguese. Communication up-country in early 1987 was accomplished 90% by HF radio, and that was limited almost entirely to the ten provincial capitals.

The year before in Ethiopia CARE and the Volunteers In Technical Assistance (VITA) had conducted fairly successful tests with HF Packet.<sup>1</sup> I asked for and studied those results. Three weeks into my work, it seemed there was a strong case for HF Packet. Thus began an exciting but frustrating; four year campaign.

In September, 1987, I submitted a plan for a district radio network to connect 50 of Mozambique's 70 districts. In the proposal was the \$30,000 for a Packet Radio net with one station to be set up for satellite work. I began to explore how to get the amateur frequencies from the Mozambique Telecommunications Department (TDM) for the satellite station and how to obtain the amateur license to work them, There were no known amateurs in country and the last license had been granted by the Portuguese government prior to 1974.

In February, 1988 I visited Gary Garriott at VITA HQ. We discussed the project and possible VITA assistance, My equipment in Maputo was not adequate to do an acceptable job of integrating packet stations for what HF requires, but VITA could do it. I returned to Maputo in late March and the Dutch letter of approval was on my desk: \$259,709 -- \$30,000 for packet! We were on our way.

On the 30th of May, I told VITA to proceed with the purchase and integration of ten packet stations. While that was going on, the National Director of the DPCCN was asked by my Country Director to assist with obtaining my amateur status. In addition, we held more meetings with TDM for frequencies for the district radios; little progress. Finally they were granted ten weeks later. About that time VITA also informed us they were still waiting for their money from CARE New York -- over two months waiting! So more telexes passed to and from VITA and to and from New York regarding payment. It was both embarrassing and frustrating. But I had to learn the CARE routines.

A bit later came another blow from Gary: the 7727C was no longer in production. Instead, the up-grade was an 8727 with similar specifications. (CODAN assured VITA the only things changed were improved electronics -- cable and connectors had not been altered,) We had no choice but to go with it. By this approval I didn't realize how it was to effect the duration, and hence, the ultimate end of the project. To start with, we learned all CODAN radios for Africa come from Australia. Any that go to the United States enter from Canada. As a consequence, the radio took over three months to get to VITA. And then testing was delayed because the microphone plug was non-standard and not available locally. This resulted in a further delay to make the required cables.

But on 24 APR 89, the equipment arrived. As I feared, however, the plugs and connections had been altered by CODAN. I began immediately to try to get the necessary changes made on

our 7727's, but by 04 JUL, we were still in trouble. Our frustration was enormous because this same equipment had worked in Ethiopia three years before. On the 12th, I faxed Gary a pin out schematic to see if he could see an answer I had missed.

I needed help and Johannesburg was closer than Washington. I called Peter Strauss -- a well known amateur in South Africa and a computer/communications expert. He arrived the end of September, 1989. After two days, suspecting frequency and antenna problems, he took one of our INCs back to test. He returned the 23rd of October with his own station (and accompanying visa and customs headaches). Our highest frequency was adequate for some tests to his station in Joburg -- 800 KM away, but the link was not strong. We traveled to two up-country sites to try connecting with Maputo. This was a serious error: one of us should have stayed back to work the base station. The results were discouraging.

Peter's report arrived on 02 NOV and basically had two recommendations: 1. -- Change the antennae to beams, and 2. -- Get higher frequencies. Of the two, at least we had some control over antennas. Getting different frequencies from TDM had been nearly impossible and we couldn't hope to do it again.

In February, Peter and I had some tantalizing attempts connecting with a Beacon from his station. So he decided to try once more to get us on the air. I saw him in Joburg on my way out for home leave in March and we made plans for my return'. He was enjoying his flying lessons.

In early May, we resumed HF tests between Maputo and Joburg. But in the next few weeks three things happen that took the heart out of the packet project. and it never really recovered. First, and most tragic:, Peter crashed and died during one of his flying lessons. Second, I got our International EMAIL system working and we became connected into the rest of the CARE missions in the world. Third, I installed the Remote Bulletin Board System (BBS) and started the process of connecting with the ten provinces by land line. On 27 APR 91 I sent an EMAIL to VITA thanking Gary for all his assistance and good wishes, but it was the end of the Packet project for Mozambique.

Note: After all the problems I had with the 7727, in early 1992, CODAN sensed there was a market and began to sell their 8525-B SSB **transceiver** fitted out. with a CODAN MODEM and a LapTop computer for a "Data over HF System."

SATELLIFE (HEALTHNET) PROJECT: DECEMBER 1987 -- JULY 1992

I first came to know of the SatelLife Project when I read about it in the 02 NOV 87 issue of Amateur Satellite Report (ASR)<sup>2</sup>. By December, I was on their mailing list as a volunteer willing to participate in their activities however I could.

From May, 1988, until June 1990, I heard nothing. Then in the June, 1990 issue of 73 Amateur Radio<sup>3</sup> appeared a report describing SatelLife and naming Dr. Charles Clements as the new Executive Director. I wrote him on 15 JUL 90, to reintroduce myself and my location. He wrote back in December to say things were moving very fast and several agencies have gotten involved with them including VITA and IDRC. Mozambique was ideally suited to be part of the project if we wished, In fact, SatelLife's field director in Africa, Mr. Mackie McCleod, had even met with the Minister of Health in Maputo. I replied in late February, 1991, saying I would pursue the required permission for frequencies and having the Minister of Health on our side would be most beneficial.

On 07 NOV 91, Dr. Clements sent an introductory letter to Dr. Jorge Barreto of the National Institute of Health (NIH) in Maputo. He spoke about SatelLife, IDRC, engineer Edson Pereira (who was installing ground stations in the region) and offered to donate a satellite station to the NIH.

I went immediately to meet Dr. Barreto. We devised a strategy to obtain the required licensing and frequencies. We also needed to get the donated equipment into the country as cheaply as we could -- free if possible! On 21 NOV, I informed SatelLife what was transpiring.

Dr. Clements said instructions for shipping the hardware had to be sent to Boston immediately. On the 26th of November, we held another strategy meeting. This time we involved the Chairman of the University Medical School and the Director of the General Hospital. It decided to have the equipment addressed to the hospital -- which would allow it to enter duty free. Dr. Barreto was asked to use his influence and connections downtown to obtain licensing on the condition the station was located at the medical school.

While we now knew where to send them, we were not sure what documents we needed to insure duty free **importation**. For this

we got help from my CARE. The Mozambican in charge of procurement told me what kind of documents we should have available to present to customs officials at the airport. I requested these from SatelliLife on 09 DEC. They were immediately sent to us by FAX. On the 11th the cargo arrived at the airport and the usual customs hassles began. More on that later.

On the 21st Edson arrived. I invited him to dinner and asked Don Findley if he would like to join us. Don and I had been planning some VHF packet experiments. He was most interested in being a part of this satellite venture. So Monday morning the three of us met first with Dr. Barreto to introduce Edson and explain what we would be doing for the next few days. Then all of us went to the Medical School to meet with the Chairman of the Faculty and the Director of the General Hospital. We all noted the equipment had not cleared the airport yet so the Director sent his men to customs to find out why. Then we did a tour of the building to determine the best location for the station. Dr. Barreto and Edson needed to meet for a while so Don and I took this opportunity to go visit TDM and check on frequencies and my amateur license. For four years I had not felt it so necessary to have my license that I needed to do anything out of the ordinary to obtain it -- a few informal lunches, the occasional coffee, etc. But we had to have that document now. I carried with me a bottle of expensive whisky. In ten minutes I walked out with my new amateur license: C9RPG.

After lunch we began to worry about customs. Still no equipment was cleared. Customs bureaucrats everywhere in the world simply hate duty free imports, and the personnel here were no different. They had stalled for nearly two weeks. It was time to bring our the heavy artillery: Dr. Barreto was chosen to go to customs the next morning. He left at 08:30. Hoping to help by just being there, Don, Edson and I got there at 10:00. We walked in and just stood behind Dr. Barreto who was seated arguing with some official. It seemed to work. A few minutes later Edson left for the airport later drove up to the Med-school with all the boxes.

Edson's time with us had been reduced from six days to little over three. We began immediately and con-t; i nued through Christmas day. At 15:30 on December 26th, we sent our first message: to SatelliLife informing we were up and working on UOSAT 14! Edson left the next day for South Africa where the head of South Africa AMSAT, Mr. Hans Van de Groenendaal received him.

**In** February of this year, all amateurs and SatelLife stations were traumatized when the great switch between UOSAT3 and UOSAT5 took place. But since then, we have mostly been waiting to use the SatelLife station as it was designed: exchange medical information among users, Also planned is a land line **BBS** that will connect the Maputo station to the provincial capitals. GARE operates one such BBS now. We expect to be operational by year's end. We have formed an Users Council as required by all SatelLife stations to make the most democratic use of both the satellite station and the BBS and look forward to an exciting future.

\* Paper for the 11th ARRL Amateur Radio Computer Networking Conference at Fairleigh Dickinson University; 07 NOV 92. The opinions expressed herein are entirely the author's and not necessarily those of CARE International, VITA or SatelLife,

#### References

<sup>1</sup>R. A. Whiting & H. P. Snyder, Report **and** Recommendation Packet Radio Feasibility Demonstration **Project 6** June 1986. (Washington DC: **VITA**, 1986).

<sup>2</sup>Moscow **Space Forum** Highlights Future Space Activities, Amateur Satellite Report (November 2, 1987; No. 161): page 1.

<sup>3</sup>SatelLife Packet, 73 Amateur Radio, (June 1990): **page 7.**

<sup>4</sup>PACSAT Proliferation, OSCAR Satellite Report, (September 9, 1991; No. 228): page 2.