March 17, 1988

Dr. Diana DeLuca
Assistant to the President
University of Hawaii
Bachman 202
Honolulu, HI. 96822

Dear Dr. DeLuca:

Attached is a synopsis of the material which Dave Swift and I are in the process of submitting to various publishers. We believe that it could be a slightly "gray paper" starting point for what could be an eventual "white paper" on the role of telecommunications in Hawaii.

We have also attached the table of contents so that you can get a better idea of the content of our proposed book. In addition, we are providing 35 copies of the Summer, 1987 edition of the Hawaii High Tech Journal which has a group of excellent descriptions of telecommunication's position in Hawaii.

In reproducing the synopsis please give due credit to the authors.

Kindest regards,

William A. Kinnaman

David W. Swift
TELECOMMUNICATIONS--TOOL FOR ALL TRADES
By William A. Kinnaman and David W. Swift, PhD

Hawaii's business, institutional and much of the social life are now absolutely dependent on telecommunications. It wasn't always so. When introduced, the telephone was a convenience. Calling an order into the butcher shop saved a five minute walk in the 1880s. Calling an order into a lumber yard today may save a contractor a one or two hour trip and dozens of hours of men on the job--hundreds of dollars with loaded labor approaching $50 per hour. The growth of long distance calling has reached a geometric gallop. In 1940 there were just 0.25 calls per telephone to the Mainland. In 1976 there were 100 times as many, and in 1987 there is an estimated 1,000 times as many calls as were made 37 years ago.

The increasing dependence on television is even more dramatic. Television transmission in the Islands started in the Fifties. In the mid-Sixties live broadcasts were first received from the Mainland via satellite. Now in the mid-Eighties, there are 19 concurrent network programs listed in the local "TV Week." News, sports entertainment, election campaigns, selling campaigns--all are devoured by a demanding audience for more time than most would admit.

Examine the communications content of each business day in Hawaii and you will find the following:
7 million local telephone calls,
1 million long distance calls,
50 thousand directory calls,
20 thousand one-way pages,
10 thousand telex messages and
2 thousand emergency calls.
Add to these tens of thousands of hotel and airline reservations, tens of thousands of automatic teller transactions, thousands of orders by brokers, scores of pages of national and international news and the nearly infinite amounts of data and the dependence upon telecommunications becomes evident.

Hawaii would close down without telecommunications. Its number one industry--tourism--couldn't live without it. An outage of just one hour could mean up to millions of dollars of lost business or added cost. There can be no question about the key role of telecommunications. There are questions, or lack of information, about the nature and character of the animal. The telecomm animal is too basic and too important to be an "unknown" or to be misunderstood.

The U. S. and Hawaii, have enjoyed a long run at being the world leader in telecommunications. One long used measure is the number of telephones per 100 inhabitants. This number passed 80 in the U. S. in 1984, a number equalled only by Sweden. This density compares to 50 per 100 in the U. K., 48 in Japan, 47 in West Germany, 46 in France, 10 in Argentina, 8 in Mexico and 1 in
Indonesia.

Other measures are meaningful, as for example, the number of days to start residential service. In Hawaii it's generally the same day for a residence with a prior hook-up and two days for all others. This compares to three weeks in France, one to two months in West Germany, six months in Spain and years in some third world countries.

What about long distance rates? Comparisons are not exact, but the Netherlands charges three times as much as the U. S., West Germany charges about ten times as much and France charges as much as 25 times as much on some routes. Even Japan has rates about ten times higher than the U. S. and, in addition, does not provide an itemized bill so that individual calls can not be checked.

The local rates can't readily be compared because of subsidies in most other countries. In the U. S. the subsidies have largely been removed. Although the local rates have increased, they still compare quite favorably with other items listed in the consumer price index.

Our nation's telecommunications systems can be described by examining five parts--customer premise equipment, the local network, the local radio network, local broadcasting and long distance. Each part blends into the others, and with few exceptions, with the world's networks through standards that insure "connectivity" and increase the value of each interconnected piece. Superimposed upon the five parts are vast private networks, many of which now exceed the whole world's transmission capability of a generation ago.

CUSTOMER PREMISE EQUIPMENT

Customer premise equipment ranges from private automatic branch exchanges (PABXs) to individual telephone stations. This equipment started down the deregulation road with the Carterfone decision of 1968 and has proliferated into an array of electronic key systems, decorator phones, telephone answering machines, automated attendants and facsimile machines. Office automation equipment is blending into the communication scene with local area networks (LANs) connecting PCs with each other, with printers and with host mainframes. PCs now have add-on packages that permit them to communicate world-wide with facsimiles.

Most customer premise equipment is sold on the basis that it can greatly improve office productivity and ability to service customers. The present equipment has more than doubled in reliability and is sold at less than half the cost of its regulated electromechanical ancestor of pre-deregulation days. The Hawaiian scene, like that on the Mainland, has been characterized by high rates of small business failure with Hawaiian Tel and Hawaiian Communications--the sole survivors of the first decade of deregulation--joining AT&T, Tel-A-Com, Progressive Communications and Trans-Pacific Systems in being
factors in today's market.

THE LOCAL NETWORK

The local network connects all of the customer premise equipment with both the local and long distance world through a network of switching centers that will be completely digital in 1992—making Hawaii the first state to enter that electronic nirvana. Hawaiian Tel has been spending about $100 million per year on the digitalization and expansion of its system. Those who long for the plain old telephone system (POTS) should be reassured that the new system will cost less to maintain and will operate more efficiently, making those many new services self-supporting as well as contributing to the efficiency of the local business and institutional community.

Wasteful competition at the turn of the century took a strong dose of regulation to cure, and local area service remains the only area where deregulation has not made much headway. However, "by-pass" (using private transmission between two local locations) is starting to be a part of the local picture, and the PUC is now deliberating on whether to join the majority of the other states by allowing "shared tenant service" ("intelligent" buildings providing all telecommunications options to its tenants). The PUC decision should hinge on whether the users can be given a choice without wasteful duplication.

Despite some recent mass outages, local network reliability remains high with a current rating of about 3.0 faults per 100 access lines per month and a target of 2.0. Attaining the target would mean that each access line would experience only one failure every four years.

THE LOCAL RADIO NETWORK

The local radio network has been expanding since mobile radio started in the Thirties to the drumbeat of the salesman proving that vehicles can greatly increase their productivity through radio contact. Now much mobile radio uses the principle of "trunking" to greatly increase its traffic capability. The miniaturization brought by transistors gave paging its start in the Sixties. Its economical use of the radio spectrum allows a pager to operate at a cost of 10 to 15% of radio telephone. The resulting low prices have attracted about 25,000 Island users to always be in touch through paging. To those who need interactive conversation, cellular service is the ideal answer with high quality transmission through a group of about a dozen cells that have been strategically spotted throughout Oahu. Two companies provide this service, aiming for a collective total of 5,000 users by 1990.

LOCAL BROADCASTING

Local broadcasting finds Oahu with the second largest number of radio stations in the nation, all fighting to serve the 50th largest market. Profits are hard to come by in radio but the FM quality is high and usage expands. TV, judging by the $50 million price tags of the most recent transactions of the mid-Eighties, continues to be attractive financially and aesthetically still attracts a wide army of viewers. Those
viewers benefit from Hawaii being in the footprint of 22 domestic satellites with a total of 390 C-Band transponders, a capacity large enough to service both TV and thousands of voice circuits. Now TV viewership is being threatened by TV's former baby brother. Cable TV, which was started in the Forties for remote communities, now attracts about 68% of the Oahu households who are in the areas being served by Oceanic Cablevision, the nation's seventh largest cable TV operator.

LONG DISTANCE SERVICE

Long distance service, started in the Islands in 1931, now is being offered by five Oahu firms, each with "Equal Access" to all Hawaiian subscribers. Two other firms are the survivors of the old cable operations which are now offering electronic mail, voice mail and facsimile to supplement or replace telex. Deregulation has fostered fierce competition which make the user's charges a fraction of those of 20 years ago. 1988 will see the initial operation of the first fiber optic cable in the Pacific, increasing the long distance capacity by the equivalent of 40,000 voice circuits.

Hawaii's central location in the time zones--six hours from New York in the summer and six hours from Perth and Singapore--make it ideal for Pacific telemarketing and management of Pacific Rim business operations. Teleconferencing can make Hawaii into an educational center where the world's best educators can either live and reach students all over the Pacific or the students can congregate and reach those expert educators who live elsewhere.

FACTORS OF THE FUTURE

In interpreting how telecommunications has served Hawaii so well and what should be done to continue and improve upon that service, the benefits of free market behavior can not be over emphasized. No other country has allowed so much of the action of free markets into its telecommunications services. No other country is close to the United States in the quality and cost-effectiveness of its telecommunications and related office automation. There is no other significant difference--not technology, not capital, not inventiveness, not managers, not dedicated people. Except for the early days of local telephone service, the users have benefited whenever they have had a choice. Competition is the abrasive that has kept service offerings bright and shiny.

What are some of the other factors that favored or hindered the century of growth of telecommunications in Hawaii? What should be done to encourage the continued growth and usefulness of this large group of tools which so affect the capability, productivity and quality of our businesses and institutions?

PRIVATE OWNERSHIP

Hawaii's 110 year history of telecommunications has seen very little governmental ownership and operation. The U. S. owes its telecommunications leadership to the private sector. Most of the telephone operations of other countries have been under the postal authorities from the very beginning. They have always lagged in the quality and the amount of services offered
to users.

Privately-owned companies in the U. S. generally introduced services first--trans-ocean HF radio; the first trans-ocean telephone cables; WATS, the first discounted long distance service; Centrex, the first PABX direct in and out dialing service; the first satellite service; the first commercial all-electronic switching system; the first "800 type" inbound dialing service; the first competing long distance services.

Beyond introducing the services first, privately-owned companies generally gave a higher quality service--less static on transmission lines, more operator courtesy, better billing service, faster maintenance, faster installation, better traffic handling capacity. Part of this was certainly due to the telephone companies responding to the rate setting authority of the regulators.

At the present there appears to be little threat to the privately owned companies that have given the U. S. such an edge in the services that its users receive. Let inflation escalate again, and the threat grows greater. The Hawaii data library being proposed by the legislative work group is a new publicly-owned service which would serve both public and private needs. There is no threat to the private sector as long as the group is not given a monopoly and the users are not deprived of freedom of choice. If there is an unserved need, privately owned companies will generally respond. If there is a choice, the service will generally be higher quality and more cost-effective.

Over 80 years ago, John Mackay gave users a choice by cutting existing cable rates from 50 to 100% with the same quality of service. Now in Hawaii Richard Kalbrener of LDUSA and Richard Moody of Sprint are affirming that they will not be undercut in pricing their quality long distance service. The moral is when the user has a choice, the service is more likely to be "choice."

REGULATION

About 80 years ago regulation came to the rescue of the users who had to subscribe to two or three telephone companies in order to reach everybody in town. Wasteful duplication was eliminated and "connectivity" was attained. In Hawaii the regulation has generally been fair to both user and investor, albeit with some excessive slowness during the inflation riddled Seventies and early Eighties. Now technology has made it possible to retain "connectivity" in most telecommunication situations with duplication that is no longer utterly wasteful.

On the federal side, the FCC has almost completely deregulated long distance service. Customer premise services were freed by the Carterfone decision. Only local service and intra-state long distance service remain. "By-pass" has been recognized as being a duplication that is cost-effective, giving the user a choice. In Hawaii the Hawaiian Tel has appropriately
chosen to take "two bites at the apple"—its tariffed transmission services and private special project equipment. The user has a choice and is better for it.

The men with a free market bias hope that Hawaii's regulators will see fit to broaden the user's choice, as long as wasteful duplication is not incurred.

SERVICE BETTER THAN EXPECTATIONS

"Service better than expectations" was the secret of John Cassidy's success about 100 years ago with Hawaii's first telephone company, Hawaiian Bell, and still remains the basic ingredient of today's telecommunication services. There have been a few lapses—during and after World War II and in the late Sixties—when telephone service sank below contemporary standards. Most service is reaching the point where the user would be surprised at a failure and, at the same time, where a failure is more important than ever before. Hawaiian Tel is targeting at a point which the user would not perceive a failure.

What happens when a service is so good that users do not expect the random failure that most certainly will occur at some unexpected time? How can the service exceed expectations when the user expects perfection? The answer is in customer education. Under any circumstances it is a "high-level" problem.

The authors recommendation is that the telecommunication community of Hawaii unite to declare a "Telecommunication Education Month" to make the business and residential users in Hawaii more knowledgeable about the benefits that can be derived through the use of these tools for increased capability, better productivity and a higher quality of life. More should know about the benefit and use of these high grade tools.

PRICING TO VALUE OR COST

In the free market arena the prices are related to the value place on the service by a user with a choice. Quite often the prices are related to cost, since the providers of the services have to make a profit in order to stay in business. In the regulation arena the prices tend to migrate away from costs into areas of low pressure, neglect or misconception. The result is a distortion which threatens to dull or stop cost improvement. When pricing under regulation is related to costs, there can be an on-going program of cost improvement.

THE RIGHT STUFF TO FIGHT OBSOLESCENCE

The history of telecommunications has been one of replacing the present plant with new and more efficient equipment. It's not always easy because the present plant has become so large and expensive that is costly to replace. Yet the pace of technical innovation has become so swift that both providers and users of service will be left behind if they don't keep their plant up to date. Short depreciation periods should be planned at the outset to anticipate the march of progress. Regulators should encourage realistic depreciation times that are in tune with the times. Regulators should continue to allow the rate of return that will
encourage the needed investment.

Users should also look at how their productivity can be improved through the use of upgraded telecommunications and office automation equipment. Salesmen exist partly to provide glimpses of what benefits can ensue from planned and proper replacement action. Users should take the position that they should actively look at how they can improve their service and response to that most important person—the customer.

SEPARATE SOCIAL ISSUES

The populists have introduced the idea of special telephone supplier treatment toward the elderly, the poor, the rural resident, and the residential user. The same populists have enlarged the arena to include low cost housing for the low income segment and free riding on the city buses for senior citizens. Somehow this treatment has not seeped through to transactions in purchases of office equipment, purchases of automobiles, furniture, and a host of other products which are necessary to improve the productivity and quality of life.

The authors are not necessarily against the social aims of the populists, but recommend that aid should be supplied directly to the targeted user. Pricing a telecommunication service according to its social use is not good business. Pricing a service to be used by hundreds of thousands to serve the social needs of perhaps 10 to 20% of the total is dangerous. Under regulation it should be priced according to its market value or cost, so as to give the proper rate of return.

Those countries that have permitted social pricing have degraded and reduced the effectiveness of the tools that are needed for increased productivity and capability. Latin America is full of examples of social pricing that has brought many of its telecommunication systems to their knees. African and some Asian countries are developing their horrible examples. Telecommunications tools should be kept sharp for their economic benefits to the whole community. Investment in social causes should not preclude or prejudice investment in improving our nation's economic health. Whatever action that is taken to help a social problem should not be at the expense of investments in productivity and capability.

THE TECHNOLOGY ROLL

The technical pace of telecommunications has reached such a pace that the last ten years have seen more progress than the first one hundred and the next five years will probably outpace the last ten. ISDN (Integrated Service Digital Network) is already serving customers on the Mainland even though the CCITT standards have not been fully agreed upon. Hawaiian Tel's digital switching system will be able to offer ISDN services to local users possibly as early as 1989. As long as Hawaii keeps its "connectivity" options open, it will be able to enjoy the fruit of the world's technical progress.

Hawaii is not expected to originate technical advances, but
it has a big role in making the most of the available tools. Those tools will continue to be provided, as in the last 110 years, by the private sector, hopefully in a free-market climate. The biggest impetus to telecommunication progress will be for business, institutional and residential users to look for the most cost-effective way to accomplish their goals, for ways of increasing their capacity to serve and for means of increasing their quality of life. The educational community has an important role in both training future providers of telecommunication services and in increasing the community's knowledge of the benefits of those services. The government's role should be that of a large user that wants more productivity and capacity to perform its functions. Those in government should be watchful to remove roadblocks to business and educational progress, should foster a better atmosphere for the free market system and should learn more about those marvelous tools that will help the United States maintain the most favorable climate for progress in the entire world.
TELECOMMUNICATIONS--TOOL FOR ALL TRADES

THE HAWAIIAN EXPERIENCE

by William A. Kinnaman and David W. Swift, Phd.

Forward--INFORMATION MOVEMENT--HEATED AND HEALTHY. Hawaii's telecommunication tools play a heavy role in a daily drama.

Chapter 1--THE STAGE IS SET. The economic and technical foundation for the first telephone operations in Hawaii.

Chapter 2--THE CURTAIN RISES. Hawaii's first telephone companies are established between 1880 and 1895.

Chapter 3--COMPETITION PROVIDES DRAMA AND DEADLOCK. Mutual Telephone goes head to head with Hawaiian Bell from 1883 to 1895.

Chapter 4--CABLE MAKES A GRAND ENTRANCE. Debut of the first successful cable to the U. S. Mainland after a succession of failures between 1874 and 1903.

Chapter 5--AUTOMATION, GROWTH AND CONSOLIDATION. Mutual Telephone's first thirty years of being a monopoly from 1895 to the Twenties.

Chapter 6--RADIO'S LONG SPINDLE-LEGS. Tracking radio for telegraph and telephone from 1900 to the first telephone cable in 1957.

Chapter 7--NEW SERVICES FOR PRODUCTIVITY AND PROFIT. New equipment and systems offer added value to users.

Chapter 8--PRODUCTIVITY BEHIND THE SCENES. The remarkable growth of mobile radio from the Thirties to the present day.

Chapter 9--LONG DISTANCE'S GREAT SPECTACULAR. The growth of long distance facilities from 1957 to the present deregulated and
competitive scene.

Chapter 10--REGULATION--HEAVEN, HELL OR HO-HUM. Deregulation of customer premise equipment and its impact on the local scene.

Chapter 11--ENTER INTERCONNECTION--VILLAIN OR HERO. Deregulation of customer premise equipment and its impact on the local scene.

Chapter 12--OFFICE AUTOMATION. The need for improved productivity brings a plethora of products to the modern office.

Chapter 13--RADIO AND TV ARE PRIME IN THEIR TIME. The growth and pervasiveness of the commercial use of the airways and cable from the early days until now.

Chapter 14--MEASUREMENT AND MANAGEMENT. A performing art gradually matures to the state of the art.

Chapter 15--NON-PROFIT UNITS CAN STILL PROFIT. A brief look at what's happening in some state institutions, particularly the role of the University of Hawaii.

Chapter 16--PREVIEW OF COMING ATTRACTIONS. Trends that will further change and amplify Hawaii's dependence on and benefit from telecommunications.

Epilogue--HOW TO KEEP THOSE TOOLS SHARP AND USEFUL. Lessons from the past that can help future growth.