

FINAL REPORT

FEASIBILITY STUDY TO PROVIDE NTU SERVICES
IN THAILAND AND SOUTHEAST ASIA

Prepared for

United States Agency for International Development

Bangkok, Thailand

by

National Technological University

Fort Collins, Colorado

February, 1993

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1. INTRODUCTION

NTU, with support from USAID Thailand, seeks to develop a shared vision and administrative structure with local partners to serve the advanced education needs of knowledge workers in Thailand in a timely manner. The NTU Long Range Plan is included in Appendix A of this report. It outlines the vision, mission and goals of the university. The instructional linkages underway or planned are described briefly in that document, as well as the rationale for developing long-term, cooperative arrangements globally.

As the first phase of a feasibility study to investigate the demand for NTU services, John D. Nelson spent the period from November 21 to December 17, 1992 in Bangkok. He met with individuals singly, and in groups, to discuss the educational, regulatory, and demand issues related to offering NTU courses. Individuals from the telecommunications industry, information technology (IT) industry, the government sector, university sector, and individuals who are consultants or otherwise active in academic and training activities were contacted. The individuals contacted are listed in Section 3 of this report.

The study concluded that there is a large demand for advanced and specialized education and training in addition to the present university and vocational education facilities available. There is significant interest on the part of universities to participate in a venture with NTU.

The cost of NTU programs in Thailand would be a factor. The NTU cost structure for Thailand will need to be defined. It is expected that costs would need to be supported by industrial or government organizations. Some of the companies interviewed expressed interest in providing support, and were very interested in establishing an NTU format for education in Thailand.

There will be significant regulatory issues that will need to be worked out. Time did not allow for these to be explored adequately. Also satellite accessibility needs to be explored.

The general consensus of the individuals that have expressed interest and possible support is that a pilot project is needed to actually demonstrate the ability to conduct such a type of activity and to show the quality of education and

training that can be made available. Such a pilot project would include the actual offering of one or more courses and interaction with students.

The following report will present the results of conversations with various representatives of companies and agencies. It will draw conclusions regarding the establishment of an NTU entity in Thailand, and will discuss the additional work that needs to be done in order to establish such an entity. That entity will be referred to as NTU (Thailand/SEA). The form that it would take is not defined in any detail at this time, but is discussed to some extent in Section 9. of this report.

2. BACKGROUND ON NATIONAL TECHNOLOGICAL UNIVERSITY

NTU is a private, non-profit institution founded in 1984 to serve the advanced education needs of today's busy, highly mobile engineers, scientists, and technical managers. NTU is, by far, the largest and most successful satellite-based graduate and continuing education program in the world. NTU is recognized by the U.S. Federal government as an exempt organization under Section 501(c)(3) and 509(a)(1) of the Internal Revenue Code.

NTU is governed by a Board of Trustees consisting primarily of industrial executives, and is accredited by the Commission on Institutions of Higher Education of the North Central Association of Colleges and Schools.

Widely shared concerns in the U.S. engineering profession have fostered the evolution of technologies and organizations that today are centered in the National Technological University. Most engineering graduates enter the work force with a baccalaureate degree today, as they did in 1900, despite the enormous complexity of modern technology. Furthermore, accelerating technological change makes career-long learning a necessity.

NTU is a cooperative effort by major engineering colleges to provide for the graduate and continuing education needs of today's busy engineer, technical professional, and manager. These campuses are linked by satellite telecommunications and new compressed digital video technology to more than 300 locations nationwide and by videotape to more than a hundred other sites in North America and abroad. By means of instructional television, engineers, scientists, and managers at their job sites can literally tune in to technical and managerial courses offered by top teachers and experts.

Over the past eight years, NTU has developed a unique infrastructure which makes the technological network effective.

Each of the 45 member universities provides discipline experts to guide the ten M.S. curricula. These curricula include:

- computer engineering
- computer science
- electrical engineering
- engineering management
- hazardous waste management
- health physics
- management of technology
- manufacturing systems engineering
- materials science and engineering
- software engineering

Administrative officers and telecommunications network engineers from each university operate 42 satellite uplinks in the shared NTU network and administer the outreach instruction.

NTU's staff are headquartered in Ft. Collins, Colorado USA, and coordinate the interface with over 150 customer organizations. A multi-leveled advisory structure and quality monitoring system continuously improve service to the adult learners. NTU's new high-quality 2.9 Mbs compressed digital video network operates on the GSTAR1 satellite to deliver over 20,000 hours of advanced education and information services annually via up to 12 ITV channels. Fort Collins serves as the network control hub.

3. TERMS OF REFERENCE

The objectives of this phase of the feasibility study as stated in the proposal included the following. As in any investigation of this type some of these goals remain unanswered, some will have changed, and a pilot project will be recommended that will address the remaining questions in more detail.

3.1 Educational Assessment

The study will seek to understand educational issues as they relate to the delivery of instructional television and/or satellite-based technical education and the granting of academic degrees for successful completion of such programs. This task will include an evaluation of credit and non-credit services currently available in a convenient, flexible manner to employed knowledge workers, and their attitude toward ITV. It will attempt to evaluate what value would be placed on an NTU degree or certificate in Thailand by the individual and employer.

Two live, interactive teleconferences between Thailand and NTU-US will be conducted as demonstrations. Participants will be surveyed before and after each program on the issues outlined above.

One or more videotaped short courses from NTU will be offered with and without local tutors. The participants will be surveyed before and after each course to assess their attitudes toward NTU, ITV, and tutorial support. (This demonstration was not accomplished in the time available in Thailand. However, the attitudes towards NTU, ITV, and tutorial support were assessed through the meetings that were held with individuals from the government, university, and industry. Uncertainties that still exist must be addressed through the proposed pilot project.)

3.2 Customer Assessment

Appropriate contacts will be made with several U.S. multinational corporations that are NTU subscribers in the U.S., who have a significant presence in Thailand.

Appropriate contacts will be identified and made with other Thailand corporations and other potential subscribers that are not based in the U.S.

Appropriate contacts will be made with Thailand governmental organizations as potential subscribers.

The potential market will be surveyed for pricing sensitivity. The question will be addressed of whether individuals or employers pay the costs.

3.3 University assessment

Potential Thailand educational partners for the new venture will be assessed for their interest in a partnership.

Agreements where possible will be explored with other instructional providers.

The feasibility of Thai universities becoming originating educational sites will be investigated.

Instructional resources that can be shared by a new Thailand venture and NTU will be defined.

3.4 Operational assessment:

Intellectual property rights in the Thailand environment will be studied. Operational changes that may be required for Thailand operation, i.e., what adaptations, if any may be necessary, will be assessed.

An appropriate delivery system for the new venture and recommended linkages with NTU will be selected.

The feasibility of NTU sharing a delivery system with other educational providers will be studied. For example, instruction in English and hotel management for the hospitality industry may provide synergistic networking opportunities.

The cost of a Thailand operation and the resources that would be required will be estimated.

The appropriate governance system for a Thailand operation will be determined.

3.5 Other:

Any other activity required to perform a comprehensive feasibility study will be carried out. All activities will be fully documented.

4. ORGANIZATIONS AND PERSONS CONTACTED

The following organizations and individuals were contacted. Details such as phone numbers, and what was discussed are included in the contact reports contained in Appendix B of this report.

AT&T

Steve P. Tsitouris,	President
Michael L. Klipp,	Director, Engineering and Administrative Services

Asian Institute of Technology

Alastair M. North,	President
Ricardo P. Pama,	VP for Academic Affairs
Suvit Yodmani,	VP for Development
A.B. Sharma,	Chairman, Project Director, Division of Telecommunications
Huynh Ngoc Phien,	Chairman, Division of Computer Science
Nicanor C. Austriaco,	Director, Continuing Education Center
K. Harigopal,	Expert: Human Resource Management, Continuing Education Center
M. S. Forbes-Ricarte,	Program Specialist I, Continuing Education Center

Chulalongkorn University

Kamchad Mongkolkul,	Director, Petroleum and Petrochemical College
Kanchana Trakulcoo,	Assoc. Prof., Petroleum & Petrochemical College
Somchai Osuwan,	Professor of Chemical Engineering

Communications Authority of Thailand

Taworn Yaowakun,	Executive Vice President (Economics and Marketing)
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Fulbright

Doris Wibunsin,	Former Director of Fulbright Program in Thailand
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ITV, Inc.

Max Sun,	President
Jenny Sun,	Vice President

F.L. Kleinberg & Co.

Dick Leary,	Market Specialist
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Loxley (Bangkok) Limited

Dhongchai Lamsam,	President
Barbara Buranasilpin,	Vice President, Business Development

Ministry of Transport and Communications

Khun Amphon,	Asst. to Deputy Permanent Secretary
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Ministry of University Affairs

Wichit Srisa-Arm,	Permanent Secretary
Porntip Kanjananiyot,	Foreign Relations Division
Wilawan Jaruariyanon,	Foreign Relations Division

National Science and Technology Development Agency

Yongyuth Yuthavong,	Director
Krissanapong Kirtikara,	Deputy Director, National Electronics and Computer Technology Center of NSTDA

NYNEX

Doyle E. Stout,	Managing Director Thailand
Peter D. Spinney,	Director-Customer Services
Jon Bader,	Managing Director Malaysia

Pacific Legal Group Ltd.

Paul G. Russell,	Director
Rutorn Nopakun,	Attorney at Law

Prince of Songkla University

Siripongse Sribhibhadh,	President
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Sukhothai Thammathirat Open University

Iam Chaya-Ngam, President

TelecomASIA

Tongchat Hongladaromp, Chairman, Executive Committee, &
CEO
Khajonsak Hannarong, Vice President, Personnel Department
Robert L. Gallagher, Director-Training Center
Chermchan Ratanakarn,

Trend Star Communications, Inc.

Eric M. Glasscott, President & CEO

University Linkage Projects

John M. Woodard, Resident Director

University of Maryland, University College-Thailand

Larry G. Hepinstall, Director

5. EDUCATIONAL ASSESSMENT

There exists a large demand for upper level education and training, particularly in technical areas. These needs are both for vocational training, and university level training in engineering, the sciences, and business. A large number of universities exist in Thailand, both in Bangkok and in outer areas, such as Chiang Mai in the north, and Songhkla in the south. Problems of low salaries for faculty and demand for their expertise in industry have led to the faculty spending a considerable amount of time in consulting. This detracts from the opportunity to develop and offer high quality upper level education.

The technological boom in Thailand has resulted in a large demand for skilled labor, a net shortfall in Bachelor of Science degrees, and a need for a higher degree of training than what is received in the university. Also much of the training that is needed is of a specialized nature, and of a nature that would generally be taught through seminars and short courses. (e.g., time management, how to effectively conduct meetings, etc.) These courses would not be taken for academic credit, but would lend themselves to continuing education units (CEU's).

When courses are offered for CEU credit instead of academic credit, there are a number of issues that must be considered. These include,

- the value that an employer places on CEU's,
- consistency in requirements for CEU credit, and
- recognition of CEU achievement in job advancement.

At companies such as NYNEX, the employees are required to follow a structured program and complete certain CEU courses in order to be considered for advancement in position. The publicizing of the guidelines of the IACET for CEU's will assist in creating a standard of CEU, that may have some recognition. This was of some interest to Dr. Yongyudh and Dr. Krissanapong of the National Science and Technology Development Agency (NSTDA) who noted that the courses need to be measured against some international "yardstick".

Thailand has developed an open university called Sukhothai Thammathirat Open University. It is modeled after the Open University in England. Students can view the lectures on public television. To receive credit they must register and take

examinations. Since it opened 14 years ago, they have awarded about 150,000 degrees. Thus, the concept of distance learning is familiar to the Thais, and is an accepted medium of instruction in Thailand. It was stressed, however, that NTU offers a different type of service than the open university.

Continuing education is also an established concept. The Asian Institute of Technology has developed a Division of Continuing Education, and have recently expanded their staff. Many companies provide for continuing education for their employees. However, most of that is currently being done overseas. The employees look upon this as a perk. The cost for that form of continuing education is high, and it is believed that employers will welcome some means of offering the training in Thailand. Also, because of the traffic problems in the city during rush hour periods, the ability to receive training at the place of business has particular attraction.

The universities that were contacted expressed an interest in NTU and were interested in participating in any venture that we develop. However, this interest on the part of the universities, must be viewed with a certain amount of caution. A university will want to keep open the option to participate in such a venture just in case it becomes successful. It is hard to assess just how enthusiastically they will actually endorse a project of this type if some investment of time and funds is required. The extent to which their faculty will want to participate is also uncertain.

It was stressed in all meetings that NTU did not want to compete in any way with existing programs, but instead that NTU courses could be used to enhance their programs by offering courses and seminars that would not otherwise be available. Furthermore, if their faculty serve as tutors for NTU courses, they will have the opportunity to interact with faculty in the U.S. In that way NTU will serve as a vehicle for professional development.

There would be advantages in having good cooperation and partnerships with Thai universities. For example, Dr. Kamchad, Professor of Chemical Engineering and Director of the joint Thailand-U.S. International Masters Degree Program in Petrochemical Technology and Polymer Science at Chulalongkorn University, expressed a great amount of interest in the program. The university is building a new technology center at the edge of their campus on Rama 4 Road. The new rapid transit system will have a stop at that location, and a new building is planned. He pointed out the advantage of such a central location and the advantages of close ties with Chulalongkorn Uni-

versity. Also their new Petrochemical building will have modern rooms that can be used for presenting NTU courses.

Another issue that relates to the need to have cooperation with Thai universities is the fact that, according to Larry Hepinstall, University of Maryland, a university must own land at the location where courses are presented. It is not clear if this relates only to the presentation of courses for academic credit or if it includes continuing education as well. Nevertheless, it is believed that by appropriate liaison and partnership with existing institutions this issue will not be a problem.

If courses are offered as a part of the curriculum of a university the cost will be a major factor. The cost for the general student to attend the university once he/she has been admitted is minimal. In response to inquiry about what cost the universities could afford, it was noted that the graduate business program at Chulalongkorn University (SASIN) costs about \$16,000 for two years, and the cost for 5 terms (two years) at AIT is about \$21,000. Obviously, someone such as employers or individuals pay for these costs.

Several individuals suggested that Thai language could be dubbed in on tapes to make them more understandable by the Thai students. Significant drawbacks exist with such an approach because there could be some distortion of the meanings in the translation, and NTU would lose quality control. Also, the language of business in Thailand is English. Most managers and upper level engineers understand English well. It is believed that for the level of individual to which this program is addressed, the use of the English language will not present a problem.

6. CUSTOMER ASSESSMENT

The primary telecommunications corporations that were contacted include NYNEX, TelecomASIA, AT&T, and Loxley. Also in that area of interest Mr. Eric Glasscott of Trend Star was very helpful.

TelecomASIA and NYNEX were very interested in NTU. TelecomASIA has the contract to put in 2,000,000 telephone lines in metropolitan Bangkok in the next five years. It is expected that this is only the beginning of a major telephone expansion in Thailand. Along with that comes the need for establishment of a major organizational structure, and the need for training many individuals. NYNEX owns a large learning center in Marlboro, Massachusetts. The learning center was described as almost being a university in itself specializing in telecommunications training. The person who is in charge of the training program at TelecomASIA was previously the director of the center at Marlboro.

TelecomASIA has put together a master plan for the training of their employees. They reportedly intend to develop a major training center for all of Southeast Asia for the telecommunications industry similar to the one at Marlboro. This would be an excellent linkage for NTU. They, along with NYNEX, have expressed the willingness to provide some degree of support for an NTU program in Thailand.

They have expressed the interest in exploring the possibility of offering selected courses from the NYNEX center in Marlboro through the NTU system. The possibility of doing so would need to be explored both from the interest of the NTU administration and the NYNEX learning center administration. The advantage of doing so is that this would provide courses of very specific interest that are specially tailored for the employees of TelecomASIA and NYNEX. The accessibility of such courses to AT&T employees and the potential interest on the part of AT&T would need to be explored.

The Director of the National Science and Technology Development Agency, Dr. Yongyuth, and the Director of one of the NSTDA centers, Dr. Krissanapong, both expressed great interest in NTU. They also expressed the willingness to provide financial support and would like to see a pilot project take place. Their interests relate more to the Information Technology sector than telecommunications. Nevertheless, this would be a market in which NTU would have programs to offer, such as the Computer Science, Software Engineering, and Advanced Technology Management programs.

At the initiative of NSTDA, a seminar was organized that was attended by 21 individuals from the IT industry and other agencies that have interest in IT. Also present was Mr. Peter Deinken of USAID. At that seminar the concept of NTU (Thailand/SEA) was presented, and ways in which this could be conducted in Thailand were suggested. A significant amount of interest was expressed by several of the attendees. Dr. Pairsak Thajchayapong, Director of NECTEC, expressed interest in all the courses being offered by the Advanced Technology and Management Program of NTU. Representatives of Shinawatra came up after the seminar to discuss the new satellite they plan on launching in December, 1993. Although many of the attendees left shortly after the seminar, it is believed that they did not feel comfortable in asking more detailed questions. What was significant, was that the more senior people in the audience stayed around to discuss NTU (Thailand/SEA), and expressed significant interest in it.

The pricing sensitivity was discussed with the corporations. Whereas costs of the magnitude charged for such courses in the U.S. would be prohibitive for the individual employees, the costs are considered reasonable for corporations to bear. This is particularly true in comparison to the costs of sending individuals to the U.S. for training. Also, NTU would be able to offer a broad range of courses that are not available in Thailand, and at a more reasonable cost than bringing in trainers from other countries to offer such courses. Also, if employees are sent to the U.S. for long periods of time their service to the company is lost, and in some cases their effectiveness to the company on their return to Thailand is diminished until they can re-establish their contacts in the business community.

7. OTHER ISSUES

A number of other issues came up that will need to be addressed, probably in the course of establishing a pilot program. These include the following.

7.1 Delivery Format

The format of the delivery of courses needs to be studied. One possibility would be to tape courses in the U.S. and then ship the tapes to Thailand by air freight or even surface. This has the distinct disadvantage of the delay in time for tapes to be delivered, problems associated with customs clearance, the potential cost of tariffs, and the unreliability of delivery caused by all of the above factors in combination.

A major concern in using solely tape format, relates to the protection of intellectual property as will be discussed later. Furthermore, a product on tape is no longer a unique commodity.

A format that is successful in the U.S., would be to downlink live and have simultaneous delivery. For Thailand, however, this has the disadvantage of the time difference (12 to 15 hours between east to west coast of U.S. and Bangkok), and the problems that may be involved with scheduling.

A third format that would be very workable is to establish a downlink site at some convenient location in Thailand. Courses would be broadcast to that site either live or from tape. The tapes can be distributed to local sites at companies or universities, or the courses could be viewed at the downlink site. This format would allow for a limited number of live video-conferences between the professor and the students as well. It would also provide the facilities for live interactive seminars on special topics as appropriate. At the present time the downlink location would probably need to be in or near Bangkok.

At future time, broadcast of lectures in country after downlinking would be a consideration. This would require considerably more effort in terms of licensing and access to air time. Nevertheless, this may, in the longer term, be a viable form of delivery.

7.2 Satellite Accessibility

The accessibility to satellites that have a footprint that includes Thailand needs to be researched. At least two downlink sites currently exist in Thailand. Shinawatra plans to launch a satellite in December of 1993, and others are reportedly going to be launched. The partnerships needed to access these facilities, and the costs, regulations, facilities, etc. associated therewith need to be researched in much more detail.

7.3 Regulatory Control

The regulatory controls under which NTU must operate need to be fully identified. Areas in which more information is needed include the regulatory control regarding awarding of degrees, and regulations related to downlink/uplink in Thailand. This needs to be investigated through the Communications Authority of Thailand, the Ministry of Education and others.

8. PROTECTION OF INTELLECTUAL PROPERTY RIGHTS

Some discussion was held with Prof. Sudharma Yoonaidharma, Faculty of Law of Chulalongkorn University. He noted that the legislature is currently planning on passing a law that will apply specifically to computer software as well as other forms of audio-visual delivery.

More specific discussion about NTU was held with Mr. Paul Russell and Mr. Rutorn Nopakun. A contact report on this meeting is attached in Appendix B of this report. These men are members of the Pacific Legal Group.

Mr. Rutorn is very knowledgeable about copyright laws and has had experience in litigation regarding this in Thailand. He has represented a few clients who have brought legal proceedings against defendants regarding protection of intellectual property rights.

It was noted that the NTU tapes would not have the same public appeal as tapes of popular music or movies. Also they would not have the same public market as the popular software on the market. Thus, the temptation for black-market reproduction of tapes would be significantly less. It was concluded that if NTU licenses a company as a site subscriber, they will probably provide a sufficient amount of protection just out of their corporate integrity and the desire not to have any legal proceedings taken against them.

The question of jurisdiction in Thailand for an American company to bring suit was discussed. In the event of any evidence of copyright infringement, NTU would have the ability to initiate legal proceedings in Thailand. For example Educational Testing Service (TOEFL) is currently suing a local tutoring school for infringement of copyright and trademark. They have no problem with the jurisdiction.

The problem with bringing suit is that the Thai courts are nationalistic in their outlook and tend to favor a Thai defendant over a foreign plaintiff. There have been cases that eventually reached the Supreme Court of Thailand, and were then overruled on the basis of loopholes. There have been almost no cases where a foreign plaintiff has been successful against a Thai defendant. Motion picture export companies have brought several suits and they have been thrown out in the Supreme Court.

The Thai law pertaining to protection of intellectual rights was promulgated in 1978, and it follows the guidelines

of the Berne convention. It is ambiguous in some areas but is very explicit, and adequate in the case of audio-visual materials. It will be revised in the near future to be more explicit in including computer software.

If NTU (Thailand/SEA) was a Thai company and the defendant is Thai they would have a better chance of winning the suit. In that case, since both the plaintiff and the defendant are Thai, the Berne convention does not apply, and many of the loopholes that have proven favorable to the Thai defendants do not apply.

NTU (Thailand/SEA) could set up a Thai company under the Thailand-U.S. Amity agreement. However, NTU probably would not want to sign over the copyrights to that entity.

The most promising approach appears to be a course of action in which, in the case of infringement, NTU would initiate legal proceedings and then attempt to reach a settlement out of court. This would be tantamount to winning the suit by requiring the defendant to pay some damages. It would demonstrate that NTU would not tolerate illegal copying, etc. Companies who are licensed would want to avoid any situation such as that, since it would reflect badly on their professional integrity. This has been done in many cases, and Mr. Rutorn seemed to think it is successful in deterring illegal taping, especially for something with as little "mass appeal" as NTU tapes.

The general conclusion was that if NTU (Thailand/SEA) is careful in setting up its way of doing business (e.g., licensing to companies) it can provide virtually the same degree of protection that NTU has in the U.S. They would have legal recourse, and although they may not be able to win in court they could win through out-of-court settlements.

9. CONCLUSIONS AND RECOMMENDATIONS

Based on the interest that has been expressed by NYNEX, TelecomASIA, NSTDA, and several of the individuals from the IT sector who attended the seminar at which NTU was discussed, it is clear that there exists a demand and a viable market for NTU type of instruction in Thailand. There still exist many uncertainties regarding financial support, the delivery format for such instruction, the need for tutors, regulatory issues, types of courses that should be offered, and others. Nevertheless, it is clear that sufficient interest and feasibility exists that a pilot project should be initiated. The discussion below will present some general philosophical aspects of the overall project and then attempt to present some views pertaining to the above issues. Recommendations for the next phase of the project are also presented.

9.1 General Considerations

One of the goals of introducing NTU into Thailand and Southeast Asia is to make American training and education present and readily accessible in that geographical area. This is part of a goal to enhance the international competitiveness of American technology. As such, it appears clear that NTU must retain an American identity in Thailand. To make the NTU entity in Thailand a part of AIT or other Thai universities would defeat that goal. Consequently, it is believed that there should be created a separate and autonomous arm of NTU in Thailand. This has been referred to as NTU (Thailand/SEA) in this report.

It will be important, however, for NTU (Thailand/SEA) to form working relationships with other Thai universities and AIT. Their faculty can participate as tutors, the facilities of the universities can be utilized for offering of courses, and the NTU courses can be used by them to supplement their curricula. These relationships will also aid in establishing the credibility of NTU in Southeast Asia, and will be important in creating the good will necessary for acceptance by the industry.

When NTU (Thailand/SEA) is formed it will need advice on a number of issues that can best be addressed by local individuals who have knowledge of the local business and academic community. For example, it will be necessary to enter into a number of linkages and/or partnerships. The most urgent of these is to develop a partnership with a local satellite company. During the first phase of the feasibility study, both Loxley/CAT and Shinawatra were contacted. The competition

between the two appears to be fairly keen. It is not clear at this time which of the two would be the most advantageous to NTU, or if there are any negative aspects of a relationship with either. Such questions are best addressed by local individuals knowledgeable about the various factors that will influence the decision.

It is anticipated that advice regarding similar questions will be needed with regard to other decisions regarding marketing, partnerships, or general operations. Consequently it is recommended that a local advisory board be created, consisting of well respected individuals from the community, with whom NTU feels comfortable, and who have an interest in seeing such an entity created. This board should include individuals who have experience and interest in both business and academia. Although this board would probably include individuals primarily from Thailand at this time, it is believed that some individuals from other countries in Southeast Asia should also be included. Flexibility should be maintained to allow for changes in membership of the board and its structure.

9.2 Issues related to Development of NTU (Thailand/SEA)

The financial support for NTU (Thailand/SEA) will need to come primarily from an industrial base. Individual university students will probably find it too expensive, particularly in comparison with the cost of attending public universities. However, several special programs currently exist in Thailand that have costs of the general magnitude that would make NTU viable. Examples of these are the SASIN business program at Chulalongkorn University, the Asian Institute of Technology, and a privately conducted, non-credit business school program of which Dr. Nelson became aware at the end of the study.

Costs for NTU programs for groups of technical personnel at some of the larger industries, particularly the telecommunications industry and some of the information technology (IT) industry are much more favorable than sending the personnel overseas for training. If it can be demonstrated that the training offered to the industry can offer what they want and need, it is believed that they will form a significant financial support base for NTU (Thailand/SEA).

The format of the instruction can be flexible, and does not need to be rigidly defined. It can be varied to accommodate the needs of the individual student group or the nature of the course being offered. It is believed that in most cases, it will be desired to have tutorial assistance at the learning site. The tutor should watch the tape or broadcast

either along with the students, or prior to presentation. Regularly scheduled discussion periods should be held immediately after the presentation of the broadcast lecture to discuss the material and answer questions. If tapes are used, and the tutor is present during the time that the tape is viewed, the discussion can take place during the lecture. A potential drawback would be if the tutor tried to interject too much discussion or additional material, such that the tape or broadcast presentation became disjointed and lost its effectiveness. Thus, it may be necessary to provide some training to the tutors before they supervise a course.

It is believed that in the initial offerings, a tape format will be easiest to deliver and most effective. One way in which this can be done is to broadcast the lectures to Thailand by satellite, downlink at a central location, and tape the lecture there. The tapes can then be delivered to sites during times of low traffic volume. This procedure has some definite advantages. It provides for very timely delivery of tapes. In the case of a course that was being taken concurrently with the time period of original presentation, it could even allow time for questions to be asked of the professor, by telephone or FAX, that could be addressed in a subsequent lecture in a timely fashion and in context with the course.

The use of satellite transmission has the distinct advantage of avoiding several layers of intermediate handlers of the tapes. It eliminates the dependency on a courier, and potential problems with schedules of flights. Furthermore, it eliminates the need to go through the customs agencies. This can be a critical link if, at an important time in the course schedule, the customs process should slow down as it has a tendency to do from time to time. Satellite delivery will also reduce the potential for lost tapes.

Although it may be easier for tapes to be shipped by courier initially, it is believed that satellite delivery will soon become the preferred vehicle. With the compressed digital format that NTU uses, with more satellites being launched, and with further advances in technology, costs associated with satellite delivery will decrease and the opportunity for interactive audio-video presentation will be enhanced. Consequently, it is most reasonable to begin using satellite communication as soon as possible.

Through discussions with Tarworn Yaowakun of the Communications Authority of Thailand, it appears that the regulatory issues associated with downlink and taping of satellite broadcasts are not very complex. He indicated that if NTU utilized

the CAT satellite and downlink facility, NTU would need no additional licensing. However, if it was desired to broadcast the lecture in Thailand after downlinking, additional permits and licensing would be required. If that is a desired mode of delivery, the issue of licensing would need to be explored in more depth.

Types of courses to be offered will depend on the needs of the clients, and the types of courses currently available or developable. The most interest has been shown by individuals in the telecommunications industry, the information technology industry, and the business community. Courses are available through current NTU offerings in each of these areas.

The telecommunications industry has a strong need for training in very specialized areas. NYNEX operates a learning center in Marlboro, Massachusetts that offers some of the courses that would be needed. Apparently, AT&T also offers courses through their facility in Ohio. The ability for NTU to offer some of their courses in Southeast Asia should be explored in more detail. This will entail travel for NTU personnel to those sites to meet with appropriate people and to observe the facilities that exist. This type of arrangement could have very positive advantages, and would help to form a strong base for the program in telecommunications.

Courses in the business area that currently are available through NTU relate primarily to engineering management and technical types of business. Many of the member institutions of NTU have strong business schools, and the issue of developing a broader base of business courses should be explored.

9.3 Phase 2 - Pilot Project and Further Studies

With the positive interest that was expressed during the first phase of the feasibility study it is evident that efforts should continue to develop NTU (Thailand/SEA). The second phase of the study should include presentation of a pilot project to the telecommunications industry and the IT community. If possible within the scope of this phase, the offering of business courses should be explored.

It is recommended that courses be offered during the pilot project of about one week duration for each of the telecommunications and the IT sector. These one week periods should include a variety of courses. A number of short segments of only one or two hour duration can be used to demonstrate different materials and to experiment with different methods of delivery, some with tutors and some without. Within this set

of short presentations some experimentation with live presentation may be possible.

To demonstrate the technical viability and the high quality of training available, a larger part of the week-long pilot project should include a course of several days duration that is specially designed to fulfill a particular training need of the client. For example, the course designed for the telecommunications industry should be selected in consultation with personnel from TelecomASIA, and may draw upon some material from the NYNEX center in Marlboro, Mass. It is very important at this stage that the course be of high caliber, and target specific needs of the client at the appropriate level of learning.

It is recommended that the pilot project courses award continuing education units. Courses for academic credit do not seem viable or necessary at this time. However, if the students receive continuing education units, the value that they and their employers attach to CEU's can be assessed.

In conjunction with the pilot program courses, demonstration of live interactive broadcasts can be presented. The United States Information Service has agreed to provide time for such a demonstration on the Worldnet satellite. The details of this discussion are presented in the contact report included in Appendix B of this report. One concept for this live broadcast would include a panel discussion between upper level executives of companies in the U.S. that have a large presence in Southeast Asia, and important dignitaries both in the U.S. and Thailand. The panel discussion in the U.S. would be broadcast to Thailand, and viewed in Bangkok. Audio linkage would be available from Thailand to the U.S. A number of different scenarios are discussed in the contact report.

The live panel broadcast and the pilot project courses would be coordinated so that the panel broadcast would provide publicity for the pilot project and demonstrate the type of training that can be provided by this medium.

Additional activities that should be included in the second phase of the feasibility study include further exploration of other markets and investigation of administrative or functional issues related to development of a self supporting entity of NTU (Thailand/SEA). This would include matters related to establishment of an advisory board, development of a local administrative staff, interaction with other universities, development of a qualified faculty of tutors, curricular

needs and availability of courses, and definition of other issues that will influence the establishment of NTU (Thailand-SEA).

The level of effort for the second phase is envisioned to include 4 months of time for Dr. John D. Nelson, who conducted the first phase of the study, 1 month of time for Dr. Lionel V. Baldwin, President of NTU, and funding for appropriate supporting staff and consultants, and associated travel costs and expenses. Within the four month effort of Dr. Nelson, he will spend three months of time in Bangkok over two separate trips, and one month of effort will be devoted to making contacts in the U.S., visiting the NYNEX and AT&T training facilities, and efforts related to the project that can be accomplished in the U.S.

Respectfully Submitted,
NATIONAL TECHNOLOGICAL UNIVERSITY


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NTU Feasibility Study
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Final Report
February, 1993

Appendix A - NTU Long Range Plan

NATIONAL TECHNOLOGICAL UNIVERSITY

NTU LONG RANGE PLAN

1992-1997

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I. PREFACE

The Long Range Plan for NTU has thirteen sections. The introductory Prologue sets the stage for all the strategies and plans by identifying the salient uniqueness of NTU as a non-traditional university. The Objectives are broken into Business and Qualitative segments. All the Strategies deal with the next five years. Section 13 also contains a 5-10 year horizon overview. Specific action programs, time lines and measurements associated with these strategies are not included in this document. The Long Range Plan serves as the basis for the specific action programs adopted in the two-year operating plan cycle.

II. PROLOGUE

NTU is unique in many different ways and is truly a non-traditional university. It has a very important and special niche in the spectrum of higher education. What is this uniqueness that sets it apart from other universities? What are those factors that dictate goals, strategies and programs that give NTU an orientation different from other sources of higher education?

It is important to recognize these differences as a backdrop for the long range plans and strategies of NTU. Following is a partial list of the most significant factors that distinguish NTU from other institutions of higher education.

1. Equal attention is given to both the advanced degree and continuing education needs of its user base.
2. NTU consists of a partnership of universities that provide the graduate courses from their respective campuses via instructional television. This represents a wide base from which to draw the best of talent and courses. As an accredited university, it integrates the courses into the individual disciplines and awards the degrees. The other courses, symposia, and teleconferences delivered and managed by NTU come from diverse sources including universities, industry and other providers.
3. Carefully-selected faculty consultants oversee the selection of credit courses and academic degree programs.
4. As a university, NTU's mission concentrates on education, with its research efforts focused on educational technology and telecommunications in education.
5. NTU's programs are driven primarily by the technical educational needs and requirements of its customer constituency - industry, government and other high-technology organizations.
6. Since students are all working professionals and managers sponsored by their organizations, they are very selective and demand offerings of the highest quality, substance and pragmatic value.
7. NTU manages and operates a sophisticated satellite network infrastructure between industry, government and the university community.
8. Distance learning technologies centered around satellite transmission of compressed digital video are used to deliver the course offerings and link the geographically dispersed students with the dispersed sources. Many courses are delivered in real time with live interaction between the students and the instructors.
9. Because of its structure, NTU's response time is unparalleled.
10. NTU's lack of high investment in fixed assets required by traditional universities (e.g., dormitories, libraries, athletic facilities, etc.) gives NTU an exceptional level of operational flexibility.

III. VISION

ENABLING TECHNICAL PROFESSIONALS AND MANAGERS TO SHARE PREMIER EDUCATIONAL RESOURCES GLOBALLY VIA TELECOMMUNICATIONS

IV. MISSION

As an institution of higher education, National Technological University's mission is to:

- Serve the advanced educational needs of graduate engineers, technical professionals and managers thereby enabling them to reach their professional and organizational goals
- Award degrees at the master's level to qualified candidates
- Explore, develop and use advanced educational and telecommunications technologies in delivering instructional programs to technical professionals and managers at their employment locations
- Provide a satellite network infrastructure linking technical professionals and managers nationally and, potentially, internationally in research seminars, technology transfer activities and related technical exchanges

V. GOALS

To be the university of choice for working U.S. technical professionals and managers; specifically to:

- Graduate more than 425 M.S. candidates annually by 1996/97, thereby becoming a top ten U.S. provider
- By 2000, award more than 700 M.S. degrees annually to become the nation's number one university in this category
- Develop relations with subscribing organizations to become the preferred supplier of technical education for their workforce
- Enable technical professionals and managers by 1995 to access NTU resources on demand
- Prepare NTU to compete for the Malcolm Baldrige Award in the first year that universities are eligible
- Develop digital transmission technology (TV and data) to remain the *de facto* technical standard for distance learning systems; by 2000, NTU will routinely deliver instruction on-demand to the user's workstation
- Continue to expand services to NTU's customers globally and, by 1997, be the primary, two-way ITV link for the U.S. to technical education worldwide
- Introduce turnkey solutions for the reception and use of NTU services in 1993

VI. BUSINESS OBJECTIVES

	ACTUAL ACCOMPLISHMENTS					OBJECTIVES				
	<u>87/88</u>	<u>88/89</u>	<u>89/90</u>	<u>90/91</u>	<u>91/92</u>	<u>92/93</u>	<u>93/94</u>	<u>94/95</u>	<u>95/96</u>	<u>96/97</u>
Total Subscriber Sites	140	242	299	350	417	500	580	660	740	820
Credit Sites	102	123	145	164	181	205	243	290	340	393
ATMP Sites*	180	273	317	491	533	668	750	800	850	900
Graduate Enrollments	2,538	3,103	3,639	4,155	4,396	4,880	5,500	6,200	6,850	7,550
Credit Enrollment per Site	24	25	25	24	24	24	25	25	25	25
Graduate Admissions	315	655	910	1,260	1,535	1,830	2,217	2,646	3,103	3,586
M.S. Degrees Awarded	14	37	56	70	118	154	198	264	341	430
ATMP Enrollments	44,000	66,000	95,000	121,000	108,000	121,000	167,000	200,000	235,000	274,000
ATMP Program Days	139	190	272	399	425	440	475	490	500	500
ATMP Broadcast Revenue Per Day	14,000	15,638	15,780	13,500	10,700	9,545	10,168	11,335	12,774	14,690
ATMP Total Per Day	14,000	15,630	15,780	13,650	10,920	9,841	13,011	15,620	18,574	22,290
Total Revenue	6,730,878	9,757,362	11,159,161	13,953,208	15,475,000	13,545,000	17,020,000	19,369,000	22,057,000	25,195,000
Credit Revenue	2,588,760	3,536,865	4,529,295	5,331,280	6,144,000	6,700,000	7,500,000	8,300,000	9,200,000	10,000,000
ATMP Broadcast Revenue	1,988,790	2,971,308	4,292,428	5,353,044	4,424,000	4,200,000	4,830,000	5,554,000	6,387,000	7,345,000
On Demand ATMP	0	0	0	24,143	30,000	30,000	600,000	1,000,000	1,500,000	2,000,000
ATMP International	0	0	0	72,500	80,000	100,000	750,000	1,100,000	1,400,000	1,800,000
Digital Video Sales	0	0	0	0	2,700,000	460,000	1,200,000	950,000	700,000	700,000
Site Educational Services	0	0	0	0	0	40,000	60,000	280,000	500,000	750,000
TVRO Sales & Maintenance	0	0	0	0	0	40,000	80,000	160,000	320,000	500,000
Subscription Revenue	435,716	470,434	627,300	441,566	595,000	575,000	600,000	625,000	650,000	700,000
Grants, Gifts, & Misc.	1,717,612	2,778,755	1,710,138	2,730,675	1,502,000	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000

* ATMP Advanced Technology & Management Programs - (Non-Credit Short Courses)

VII. QUALITATIVE OBJECTIVES

GRADUATE LEVEL (46.5% of revenue in 1992/93 and 1993/94)

- Identify programs and deliver the courses that are responsive to customer needs
- Provide practicing technical professionals and managers easy and convenient access to highest quality education cost effectively
- Continue to develop processes which will result in the highest quality courses and degree programs from the best academic sources
- Develop cooperative arrangements between NTU and its member universities which will improve engineering faculty competence and productivity, encourage the exchange of outstanding courses and instructors, and develop innovative methods for delivering NTU educational materials
- Increase the completion rate of students admitted to degree programs and improve the advising support for admitted students
- Facilitate programs of study leading to the Ph.D. degree awarded by member universities

NON CREDIT (34.4% of revenue in 1992/93 and 1993/94)

- Identify customer needs and deliver high priority short courses, tutorials, and research seminars
- Develop and deliver course sequences defined by professional societies and/or user groups
- Establish NTU as the preferred supplier of non-credit instruction
- Pioneer the international exchange of premier educational programs
- Design and implement a process to deliver ATMP video files directly to the learner on-demand

GRANTS AND DONATIONS (9.2% of revenue in 1992/93 and 1993/94)

- Utilize grants and donations income on new development activities and innovative applications of the network

SUBSCRIPTIONS (3.8% of revenue in 1992/93 and 1993/94)

- Utilize site subscriptions to assure commitment to the NTU network
- Concentrate on corporate-wide/agency-wide/state-wide subscriptions as the growth vehicle for those organizations with multiple locations

MISCELLANEOUS (6.1% of revenue in 1992/93 and 1993/94)

- Supply customers with DCV and TVRO equipment necessary to participate in the NTU network
- Maintain and service NTU DCV equipment in a variety of ways chosen by the customer
- Provide on-site personnel to administer NTU programs and technical education under contracts when requested

VIII. STRATEGIES

1. GENERAL AND UNIVERSITIES

NTU will aggressively capitalize on the momentum which it has as a result of the network conversion to compressed digital video, coupled with the growth of member universities and customers. The vision statement recognizes the real potential to develop meaningful global linkages in the 1992-97 time period for the benefit of NTU and its stakeholders.

NTU is currently accredited to offer academic credit instruction and programs of study leading to Master of Science degrees to students in the United States, Canada and Mexico. The uniqueness of the education program offered is apparent from the following list of instructional providers:

45 Member Universities

Arizona State University	University of Alaska at Fairbanks
Boston University	The University of Arizona
Colorado State University	University of California at Berkeley
Columbia University (pending)	University of California, Davis
Cornell University	University of Colorado at Boulder
The George Washington University	University of Delaware
Georgia Institute of Technology	University of Florida
GMI Engineering & Management Inst. *	University of Idaho
Illinois Institute of Technology	University of Illinois at Urbana-Champaign
Iowa State University	University of Kentucky
Kansas State University	The University of Maryland College Park
Lehigh University	University of Massachusetts at Amherst
Michigan State University	The University of Michigan
Michigan Technological University	University of Minnesota
New Jersey Institute of Technology	University of Missouri-Rolla
New Mexico State University	The University of New Mexico
North Carolina State University	University of Notre Dame *
Northeastern University	University of South Carolina, Columbia
Oklahoma State University	University of Southern California
Old Dominion University	The University of Tennessee, Knoxville
Purdue University	University of Washington
Rensselaer Polytechnic Institute	University of Wisconsin-Madison
Southern Methodist University	

* Contributes solely to the Advanced Technology & Management Programs

Additional Producers of Advanced Technology & Management Programs

Universities

Auburn University
Carnegie Mellon University
Governors State University
Massachusetts Institute of Technology
Rochester Institute of Technology
Stanford University
Virginia Polytechnic Institute (VPI)

Societies

American Chemical Society (ACS)
American Institute of Aeronautics and Astronautics (AIAA)
American Society of Mechanical Engineers (ASME)
Implementation Management Association (IMA)
Institute of Electrical & Electronics Engineers (IEEE)
International Society for Optical Engineering (SPIE)
Materials Research Society (MRS)
National Association of Female Executives (NAFE)

Others

American Management Association (AMA)
Applied Business Telecommunications (ABC)
Computer Channel Incorporated (CCI)
Digital Equipment Corporation (DEC)
Economic Development Administration (DoC)
Executive Communications, Inc. (ECI)
Hewlett Packard Company
IBM (International Business Machines)
Industry Education Television Council of Santa Clara - IETV
Industrial Research Institute (IRI)
NATO
Public Broadcasting System (PBS)
Semiconductor Research Corporation (SRC)
The Science and Engineering Television Network (SETN)
Tustin Institute

For NTU customers and individual learners to obtain maximum benefit from the combination of the instructional resources outlined above and NTU's state-of-the-art telecommunications system, NTU must continue to improve its processes. The challenge is not necessarily to offer more hours of instruction, but to better link each learner to educational resources at the time and place, level and duration desired. The focus must be responsively satisfying individual learner needs.

Each member university and regular producer of ATMP offerings desires to serve the engineers, technical professionals and managers employed by NTU customers. These providers compete to offer the best instruction to knowledge workers. Each seeks to excel and earn the loyalty of the adult learning community, and generally each has specific strengths and market recognition. NTU orchestrates, guides, markets, delivers and evaluates the diverse offerings. The goal is not to exclude talent, nor to play favorites, but rather to provide the learner with premier resources in a cost-effective manner. Therefore, NTU will continue to add producers in a very selective way whenever the qualifications and investment of the new institution maps into the needs of the NTU learner community.

NTU will continue to develop its elaborate system of advisory groups with stakeholders at all levels. NTU managers will become more involved in each of these goal-oriented activities. Building on the experience with NTU Chemical Process Industry Advisors, special advisory panels will be formed for the federal customers and other market segments requiring special focus.

Academic programs will increase the rate of graduation of students admitted to degree programs and reduce attrition. Strategies include improving the advising/mentoring process; providing conferences for faculty and students to learn together face-to-face; planning course schedules with more student input and more guarantees for annual availability of required courses; implementing easier registration procedures; and more marketing in combination with ATMP initiatives.

NTU must increase the ATMP revenue earned per day of programming in order to maintain and enlarge the providers listed above as member universities, non-member universities, technical societies,

corporate sponsors and others. This plan calls for:

- better definition of customer needs
- better identification of individual learners and their needs
- better market research using modern database techniques
- better communication to users via Personal Automated Search and Report Systems
- more investment in sales staff and customer support

A complementary effort will be to improve the reuse of the best ATMP courses and symposia. A new process will be developed in collaboration with several of NTU's best customers to empower technical professionals to order modules using an automated system and to receive courseware from NTU at their desk overnight. These procedures are essential precursors for on-demand delivery via satellite and LANs. Additionally, NTU will develop its foreign customer sales by providing special procedures and training for foreign site coordinators.

Digital compressed video (DCV) technology is inherently more powerful and, coupled with NTU's integrated digital system, provides an excellent platform to maintain leadership as the *de facto* standard for modern distance learning networks. In 1992-93, NTU will implement the value added features of its system: addressable channels to deliver what the customer ordered from up to 10 simultaneous live broadcasts; automatic VCR control; facsimile transmission with lectures; high-speed data transmission to support hard copy file transfer and multimedia experiments; and authorization control to minimize piracy.

New DCV opportunities will be pursued vigorously. NTU will develop more interconnecting networks such as we are now demonstrating with the U.S. Air Force and the Michigan Information Technology Network (MITN). Examples of contacts now being explored include INPO, Federal Highway Administration in the U.S. and Latin America, and several large customer networks. NTU will work as a value-added supplier of SpectrumSaver technology from 2.9 to 6.6 Mbs. Linkages with Europe, Japan, Australia and Southeast Asia will be demonstrated in 1993, and by 1995 routinely employed.

The NTU digital broadband network with video and high-speed data capability will enable innovative faculty to create new learning environments. On-demand delivery/networking to the learner's workstation and portable personal computer is the target for 2000. Systematic progress with strong collaboration by several major customers will be underway in 1993. NTU will be a world leader in evolving interactive, multimedia networks for education.

Becoming an NTU customer will become easier soon. NTU is developing turnkey TVRO installation and maintenance services. Financing options for the above services will include monthly payments for purchase, lease or rental. Access fee options may be bundled into the payment plans.

Quality improvement will continue at a faster pace. More staff training and team support are planned. Processes to improve and simplify the customer/learner interface will be identified, goals set and metrics charted. Site coordinators will be supported by more training and improved communications. Where required, NTU will provide on-site personnel under contract to manage NTU and other technical education programs. As a preferred supplier, NTU will work with each customer to implement strategic programs tied to business goals.

During the 1992-97 time period, NTU will increase its investment in marketing and public relations. We will communicate our vision and status as a premier resource of advanced educational services. Value and return-on-investment benchmarking will be stressed. Public recognition of NTU will be improved through an innovative, professionally implemented effort. We will work to foster alumni loyalty and creative input.

NTU will strengthen its financial status in the next five years. An endowment campaign will be implemented during this period. Corporate and federal grants and contracts will be pursued to assist in new developments. NTU is well situated to participate in the shift from defense to civilian investments in the economic infrastructure. NTU will become better recognized as a national resource in the 1992-97 period.

2. GRADUATE PROGRAMS

The top priority goal of the NTU academic program is to provide easy and convenient access to the highest quality courses and degree programs to practicing technical professionals and managers of subscribing organizations cost effectively. In order to accomplish this goal a number of actions are necessary. These include customer needs assessments, degree program development, course identification and course improvement processes. The strategies employed for each of these steps are discussed below.

NTU relies on its customers to perform their own educational needs assessments and encourages the subscriber to communicate those needs to NTU. The NTU Executive Advisors provide a forum for the discussion and identification of educational needs. They also provide an assessment mechanism for estimating program enrollments. NTU has also devised other ways to implement a needs assessment effort. NTU has established the Special Majors Program which allows individuals to propose a degree program based on courses from the NTU Bulletin. If enough individuals propose the same type of program then NTU develops the desired program as another NTU MS degree option.

The strategy for degree program development requires the participation of the customers as well as the academic course suppliers. Agreement between these participants leads to academically sound degree programs which are responsive to customer needs. Recent new NTU MS degree programs include Health Physics, Hazardous Waste Management and Software Engineering. In each case, a cooperative process was used.

The Health Physics degree program is well defined and available at five NTU Member Universities; only about a dozen U.S. universities offer this degree program. Faculty from these three NTU institutions met with customers, mainly Department of Energy contractors. The result is a strong degree program as defined by the professional society with top instructors from NTU members.

The Hazardous Waste Management degree program is unique. NTU customers, principally DoE contractors, defined the needs as being for waste management, not environmental engineering. The NTU task force defined a program which has four required core courses: an overview course, a risk assessment course, a fate and transport course and a laws and regulations course. The remainder of the program allows the student to focus on waste treatment technologies and technical management topics.

The Software Engineering degree program desired by NTU customers included the six core academic courses developed by the Software Engineering Institute (SEI) at Carnegie Mellon University (CMU). Although CMU was not an NTU member university, NTU proceeded to develop the desired program based on member university course offerings which essentially parallel the SEI program. Subsequently, NTU made special arrangements with SEI to also make the specific courses desired by customers available via the network. NTU students have choices, therefore, in this evolving discipline.

The strategy for defining new NTU degrees is working well. A new degree program in Chemical Engineering is now being considered with the active participation of NTU customers from the chemical process industries.

Strategies for identifying sources of courses for NTU degree programs are evolving. Initially NTU courses were those selected for NTU by participating institutions. Recently, many more courses are submitted to NTU than can be broadcast. Therefore a course selection process has been established. Those courses offered by NTU Outstanding Instructors are automatically accepted for inclusion in the upcoming NTU Class Schedule. Additional courses are accepted after being evaluated by NTU academic program chairpersons. The evaluation data includes previous student evaluations, enrollment data, and member school recommendations. The process is evolving continuously in an effort to implement total quality management in the course selection process.

The NTU Electrical Engineering Faculty have established an experimental program for assessment of course sequences. Participating departments are asked to submit course sequences in technical areas of special competence. The faculty have evaluated thirteen such submissions, to date, and chosen four as course sequences of highest quality. These sequences are from departments having international recognition for competence in the technical area with strong research efforts. One of the sequences involves two universities. These course sequences are automatically included in the appropriate class schedule. The strategy is to seek in-depth, high quality courses based on world quality research and educational efforts in specific areas, and to encourage cooperative educational efforts between NTU institutions. Thus, the course selection strategies are designed to identify and select the courses of highest quality based on student, as well as faculty, evaluations.

Many NTU customer employees, especially older ones, are not interested in seeking a degree or even academic credit for an academic course. NTU has responded to this need by establishing its Technical Vitality Initiative Program. This target population can enroll in high demand courses at a lower fee than the degree seeking students and get the same educational experience except that no credit is granted.

A major NTU asset is the consortium of educational institutions. This source of high quality education is the heart of the NTU academic program. The strategy for dealing with this asset is important to NTU and its future. The basic policy is to have an open operation, open with the only constraints being based on quality. NTU also understands that these institutions must be able to realize a return on their investments to maintain high quality ITV facilities and uplink broadcast facilities. The NTU strategy is to deliver the highest quality courses available at competitive prices. Quality is the essential goal.

Higher education is faced with the need to make major changes caused by reduced funding and expanded needs. Some state governments are establishing telecommunications networks to bring educational opportunities to a larger population and, at the same time, reducing funding for higher education. Universities must find ways to increase faculty productivity, avoid faculty obsolescence and improve student access to high quality courses. Educational technology as applied by NTU is an excellent method for attaining all of these goals.

The NTU strategy is to provide NTU institutions with low cost access to NTU academic courses that are being broadcast for their internal use. This can respond to the student needs while increasing faculty productivity. NTU will increasingly provide interested faculty with professional development opportunities via the network. NTU plans to work with member institutions to provide educational materials for distribution over state educational networks. These NTU strategies will aid member universities to make the changes that are being imposed by fiscal realities. The NTU "open system" policy will allow universities to develop innovative methods for dealing with new realities.

NTU will increase the faculty involvement in all NTU educational efforts. This will improve the cooperation and sharing needed among institutions. Such efforts will allow the member universities to maintain and improve the excellent technical education presently available on the member universities' campuses. Channel time is reserved for faculty use in projects at nominal prices.

New schools may be added to membership. Recent additions include Michigan State University and The University of Michigan. Each will bring new and needed programs in technical subjects to NTU customers. NTU asks the universities to identify their strengths and offer these services via NTU. All member institutions have identified special technical areas for excellence. These have also received special emphasis by the institution, and are the areas of special interest to NTU and its customers.

Although NTU does not offer, nor plan to offer, doctoral degrees, NTU students seeking opportunities to extend their studies will be facilitated. The strategy is to encourage member universities to develop an innovative use of the NTU system. NTU schools may offer their courses via the network and then work with each Ph.D. candidate to realize a dissertation. Such an arrangement will benefit both the students and the universities. The students can remain gainfully employed while completing course work, so that the universities would not need to provide assistantship funding. In addition, the students will be working in an industrial research environment, thereby adding to their competence and knowledge, as well as specialized facilities that may be available from the employer.

NTU plans to improve the completion rate of admitted students. The first step is to determine why some students are not finishing in a timely fashion. Then, NTU will work on developing processes for helping each admitted student. This is part of the general effort to improve student advising.

The MOT model of one-week residencies will be expanded to other disciplines to create an excellent learning environment, to encourage dialogue, and to discover new opportunities. NTU's first annual weekend conference for engineering managers and faculty is planned in 1992 and others will follow in other disciplines.

Technology will also be employed to improve linkages for advising. The installation of a relational database will aid NTU advisors by making the student information readily available. Additional technology such as E-mail will also help improve advising. Students will be able to leave messages without the need to play telephone tag. Faculty advisors will be able to respond, and retain a printed as well as an electronic record of the interaction. These tools will be available to NTU staff as well. Technology in the form of expert systems will also be implemented. Such systems can provide automatic analysis of student Program of Study Plans to analyze compliance with requirements. Thus, technologies will be part of the strategy for faculty and staff aid to students.

A strategy for developing a student mentoring program is under development. The initial efforts are focused on the NTU Management of Technology students. Each student is required to complete a field research project. Competent faculty advisors are assigned to each student, but, in addition, a company manager is identified as a student mentor for the project. NTU will expand this effort to other programs in the future.

Clearly, the NTU graduate program plans to continue to respond to customer needs with strategies which will serve as models for similar educational programs in other academic areas. The high quality NTU programs and courses will also provide a basis for expanding internationally. The NTU strategy is to create a cooperative environment with foreign institutions which will provide a two-way exchange of high quality technical education resources.

The NTU Association of Alumni and Alumnae has recently reorganized with a new director and three committees: The Constitution Committee, The Advancement Committee and The Communications Committee. Their goals include: (1) extending recognition of NTU beyond the member institutions and receiving organizations; (2) communicating to the world that NTU is a premier, world-class university with graduates who have received a high-caliber education; (3) creating higher acceptance and recognition throughout the industry; (4) mentoring of graduate students at their sites; and (5) working with NTU to develop programs where the network may be used to fulfill the continuing educational needs of graduates. We expect the efforts of this group to result in increased graduate enrollments and a higher rate of completion of degree programs.

3. ADVANCED TECHNOLOGY & MANAGEMENT PROGRAMS

Customer Needs

It is much easier to get producers to develop and deliver courses than it is to get customers to define their needs. This is ATMP's most pressing requirement: To create a better way to define customer needs that translates into usage of ATMP programs.

ATMP's diverse assortment of course suppliers (universities, consultants and professional societies) represent a strategic asset to NTU's customers. They consistently deliver live/interactive educational programs representing state-of-the-art knowledge by experts in their field. The supply of expert speakers and state-of-the-art course information outpaces NTU's ability to define customers needs.

Customers have advised NTU to shift from being "supplier driven" to being "customer driven." However, when asked, many customers struggle to generate a list of their needs. More often, they offer

NTU a "snapshot" of "yesterday's" prescriptions instead of new technologies and skills that will help lead their organizations today and in the future.

Also, customers generally ask NTU to broadcast programs that are technically narrow and appeal to a small audience. Course requirements that have wide appeal are often satisfied by internal corporate resources.

Generally, when a new area catches customers by surprise and ATMP is quick to respond with a broadcast, NTU does well. However, the pattern has been: as a technology stabilizes or becomes mature, and if there are enough staff who need to be updated, sites tend to internalize the educational process with customized courses.

Traditional needs assessments take too long and result in "old snapshots" of corporate needs. Work assignments, knowledge areas and skills change faster than organizations can respond to thresholds of change.

There is also a tendency for corporate educational resources to migrate, as conditions change, from long term investments in knowledge updates to crash investments for skill updates or "need-to-know" information.

Defining customer needs cannot be done by the customer or NTU alone. Under these conditions, NTU's openness to explore and integrate traditional and new approaches is imperative. Current approaches are not keeping pace and, therefore, are not getting the job done.

An ongoing process of defining customer requirements cannot be accomplished without the following actions:

- A. **Define how ATMP's top 15 customers specify their educational needs; who are the internal consultants; what are the timelines.**
- B. **Do a complete analysis of ATMP's database, outlining buying tendencies of all NTU customers on a site-by-site basis for each technology or program area.**
- C. **Target professional societies, trade magazines and conferences that represent the major interests of ATMP's top 15 customers.**

This approach, begun in the last quarter of 1991, resulted in the successful launch of a new program area in optics beginning in January 1992. Three other topical areas being developed for 1993 are: Chemistry and Polymers, Chemical Engineering and Electromagnetic Compatibility and Interference. Another area to be initiated before the end of 1992 will be in Computer Communications. A systematic list of technology areas will be developed as a result of completing items A and B above.

- D. **Participate in meetings with industrial advisors to define educational interests and trends.**

To date, NTU's Chemical Process Industry Advisors have demonstrated the value of this process. Future meetings will be supported via satellite and phone bridging for follow-up activities.

- E. **Identify and work with consultants to define major elements of a technology and create a list of respected faculty and experts.**

This has been useful in the area of Electromagnetic Compatibility and Interference. Advice to NTU helped identify 40 of the most respected contributors and speakers in the field. Working with several consultants, ATMP has been able to target not only the most appropriate topic,

but also the best speaker. This process will be extended to involve key champions at NTU sites.

F. Given several defined technology areas, promote a series of six to 12 coordinated courses per year for each technology or defined subject area.

Optics is the best example of this activity. A series of six topics promoted with a color brochure, reproducible posters, three editions of NTUplink, electronic distribution and direct mail of over 14,000 personalized letters to NTU sites resulted in revenues that averaged \$22,000 per broadcast day for the series (an objective targeted for 1995/96).

Each of these activities will lead to a better definition of customer needs that will involve professional societies and/or user groups, direct contact with customers and active involvement of producers.

By 1995, this approach to defining customer needs will be applied to 10 separate technology areas.

Preferred Supplier

To become a preferred supplier of non-credit courses, ATMP must do the following: focus continuously on improving quality leading to measured results, define leading edge offerings, provide cost-effective programs and timely promotional material.

Quality begins with getting ATMP's "house" in order. This ongoing process involves: listing customer-oriented interfaces, outlining each process, measuring expectations, and empowering staff to make changes.

By the end of fiscal year 1992/93, a list of customer interfaces will be defined, along with a brief outline of each process and critical measures for success.

Defining leading edge offerings will be an outcome of determining customer needs. The key is that courses are timely. Scheduling courses before or well after a critical mass of customers are interested has to be avoided. It is important to explore several approaches that will serve as predictors of customer interest when new course opportunities develop. As the emphasis on technologies evolve, ATMP's strategy must be responsive and "smart" in predicting not only related courses but also how to define and market directly to an increasingly changing and mobile audience.

International Exchange

Sending ATMP programs abroad needs to be balanced with offering of internationally-produced courses over the NTU Satellite Network.

ATMP's strategy will be to seek out professional societies that have international activities. While defining customer needs and listing U.S.-based experts and speakers, ATMP will systematically seek and invite experts from abroad to participate as lead speakers or as resource people in broadcast of courses directed towards NTU's subscribers.

Another parallel approach will be to target universities or consultants where NTU's international sites have established relationships. NTU will seek their help in identifying areas of expertise from faculty and experts. Sponsorship by NTU international sites may lead to an ongoing source of new speakers that NTU can approach and invite to present on the NTU satellite network. In this case, sponsorship will help guide NTU in recognizing local values that can be translated into successful and long-term involvement with international experts.

On-Demand Delivery

By 1995, NTU will have developed and demonstrated the processes which will enable technical professionals and managers in all NTU customer organizations to access ATMP on demand. Pilot programs will be developed, in cooperation with two or more major customers in 1993, so that field tests can be evaluated before general marketing to all NTU customers. This effort is an essential precursor to the longer range goal to routinely deliver instruction, on-demand, to the user's workstation using digital transmission technology (NTU LAN-to-customer-LAN via satellite DCV).

The first step is to perfect an interactive computer file available to individual learners at their workstations. This database will include a listing and description of all ATMP instruction available in NTU master files. Previous user evaluation data will be provided where appropriate. Facilities to allow each learner to tune a software agent to assist searches for relevant courses and modules will be provided.

Appropriate contracts between NTU and the customers in the pilot program, as well as NTU and its ATMP producers, must be negotiated to make this program possible.

A critical element of the NTU-customer agreement will be the automation of authorizations, deliver verification and billing procedures. Overnight air express or other delivery methods will be evaluated with emphasis on getting the integrated instructional materials (videotapes, hardcopy notes and any computer discs) to the individual's desk reliably and cost effectively.

4. EDUCATIONAL AND TELECOMMUNICATIONS TECHNOLOGIES

From inception, NTU has been vitally involved in research as it applies to the educational mission. Pioneering, in 1986, a cost saving method for analog transmission - half transponder - was only the first in a series of advanced research applied to the educational mission of NTU.

In the spring of 1992, NTU became the first national network to implement compressed digital video transmission via satellite. This satellite transmission breakthrough was accomplished in less than two years from the time that the first prototype digital decoders were released from the laboratory for field tests. In fact, NTU provided the test bed for the developer of the nation's first broadcast quality, compressed digital video. Today, NTU is now broadcasting 10 channels of compressed digital video on a single satellite transponder.

NTU, with its national satellite distribution system, provides an excellent test bed for new advances in educational technologies. In the coming years, this research and development platform, along with a cadre of highly trained technicians, will be the basis for a number of leading edge research and development activities that will take advantage of the digital video transmission system now in place. Some of these new efforts will include:

- The high speed transmission of text and other graphical material in the video data stream. This type of material will be transmitted from a computer on the school campus, or from NTU headquarters, to a high speed laser printer at the customer's location. This method of transmission of large text files will eliminate the costly ground transportation methods now in place and will insure that last minute updates can be delivered in high quality formats and on-time.
- The ability to transmit facsimiles in the video data stream. This will greatly add to the expedient delivery of class handouts and other instructor material, directly to the student viewing areas.
- Distribution of the compressed digital video signal, as received at the earth station, to all viewing areas within a customers facility, via the LAN (local area network).
- NTU will also be working with computer manufacturers of engineering workstations to develop a means for viewing, storing and recording the compressed digital video signal at engineering workstations.
- As a forerunner to the above effort, NTU will be working with various manufacturers to develop hardware that will enable a compressed digital video signal of 4 to 6 hours in length to be stored on a single low cost 8mm magnetic tape. With this capability, NTU will be able to offer "on-demand" viewing of a library of technical seminars and other training material.

In the late summer of 1992, NTU will install a new telephone system and associated voice mail system. This new system is a hybrid key/PBX and will be operated in unattended mode. Customers will be provided with an NTU telephone directory and will have direct access to the individual to whom they wish to speak. Optionally, a caller can reach the switchboard operator for immediate assistance. This new system will improve the efficiency of all NTU personnel in that paper messages will be replaced with working voice mail.

In an incremental fashion over the next two years, NTU will improve ADP support to both employees and customers through the use of a state-of-the-art relational data base. Faculty, staff and students will benefit from NTU's ability to consolidate information which now resides in several different places. NTU's support to customers will also be greatly improved with complete knowledge of each customer's environment, products used and past enrollment in both credit and short courses. Student access to unrestricted portions of the database will also be possible.

In the spring of 1993, NTU will be acquiring new satellite services for transponder time. The new satellite will be two to three times more powerful than the current satellite from GTE Spacenet. This will greatly improve customer reception during rain fades and in fringe areas of the U.S. The move to a new and more powerful satellite will also improve NTU's opportunities to place additional video carriers on the transponder.

In the 1993-95 period, NTU will be broadcasting digital compressed video to Europe via PanAmSat and possibly to the Pacific Rim. These international initiatives will not only provide additional support for our current multi-national customers, but will offer opportunities for increased revenue from foreign consumers.

Beginning in the fall of 1992, NTU will organize and develop a customer equipment services group to provide end-to-end maintenance and repair of the NTU site video reception equipment. As part of this group's charter, turnkey systems (antenna, head-end, television sets and VCRs) will be offered to all new subscribers. This new service organization will ensure that NTU customers receive the highest quality educational video with equipment that is properly maintained.

5. MARKETING

A target account strategy has been adopted based on: (1) the penetration by industry group and by size of organization; and (2) NTU's present and proposed curricula areas. This strategy targets about 65 specific accounts within the Fortune 200 Industrial Corporations, Fortune 10 utilities, and federal high-technology organizations. Specific marketing plans are or will be formulated for these target accounts.

In addition, NTU will seek to: (1) aggressively convert existing single sites of large companies/agencies to organization-wide customers; (2) add new sites (both U.S. and international) from existing corporate/agency-wide customers; and (3) develop international initiatives to open major markets for NTU programming.

Six strategies have been formulated relative to NTU programs: (1) a "market needs" versus a "products offered" strategy to target credit and non-credit programs to the priority needs of large customers and professional groups; (2) program pricing and packaging attractive to large customers; (3) use of special event weeks on topics of interest to large customers; (4) additional M.S. programs to meet the expanded needs of major industry groups; (5) additional non-credit curriculum tracks to meet needs of major industry groups; and (6) turnkey equipment packages for new sites and maintenance packages for existing sites.

Other key marketing strategies include: (1) minimizing the "time cost" to NTU users (e.g., archiving key programs for subsequent viewing by individual users in large customer organizations); (2) interfacing NTU systems with advanced engineering workstations in order to facilitate on-demand delivery of technical education modules; (3) developing, modeling and encouraging the enhancement of NTU courses to take full advantage of workstation capabilities; (4) providing turnkey solutions technology, installation and operation; and (5) creating special public service programming with particular appeal to major corporations to use for community relations purposes.

Also, NTU has adopted a strategy of experimenting with various approaches to small and medium-sized businesses. First, under an Economic Development Administration (EDA) grant, NTU is delivering a special series of interactive technical assistance programs to business entrepreneurs at or near their places of work. Second, efforts are continuing with consortia and campus outreach programs to find and develop more effective ways of reaching employees and managers in the smaller organizations. The most significant consortium arrangement is the one approved in July, 1992, with the Michigan Information Technology Network (MITN). In addition to reaching many industry sites, the plan includes NTU access for small employers throughout the state by installing downlinks at the Michigan community college campuses.

6. CUSTOMER AND USER SUPPORT

NTU's strategy is to provide several levels of support to all its customers and users. This support will be offered before, during, and after the user receives the desired course. In the past the distinction between NTU customers and users was not apparent; however, when providing service NTU has found a great need in identifying these groups and ensuring each is given the support needed to do their job. To facilitate a more strategic delivery of support, the NTU customer will be identified in the following categories:

- * Subscriber - a corporation, single corporate site, consortium or agency which signs a Letter of Understanding and becomes a network member.
- * Non-subscriber - any organization, agency or individual who registers for NTU programs but does not become a network member.

The NTU user is one or more people who receive an NTU academic course or an ATMP non-credit short course or seminar. These people are usually employees or associates of NTU customers at subscribing or non-subscribing sites.

A strategy to provide sites with NTU consulting services to expedite and ease their decision-making tasks has been drafted. Very often, the decision to receive satellite-delivered education and training can not be made until a significant amount of research and planning is completed by the organization or site. This strategy recognizes these needs and facilitates extensive early planning support to customers. Areas included in this support are assisting customers with cost analyses, equipment selection, financial considerations, staffing, administration, and operations.

NTU implemented a strategy to offer turnkey systems installations for both uplink transmission facilities and downlink receive sites. The strategy includes NTU negotiating for preferred equipment prices and service rates which are then made available to our customers. To ensure all NTU customers and potential customers have alternatives to using large cash outlays in getting hardware, NTU also established an installment payment plan with variable terms. One of the expected outcomes of implementing this strategy is the reduction of customer start-up expenses and anxieties normally found when bringing up a new site.

Another support and service strategy provides comprehensive training for site personnel, university staff and others involved with bringing NTU courses and programs to the sites. The training would be held at least twice each year, once via the satellite network during the winter and again during the summer at the NTU Annual Conference. Sites failing to attend either of these sessions could receive videotapes of the televised training program at any time during the year. Special training classes for foreign sites will be developed and administered via video tape, PC's and interactive on-line system applications.

Ultimately, this customer and user support strategy provides full access to all NTU's headquarters support services which include:

- * Direct on-line system access for student and course information retrieval
- * Registration assistance for academic and ATMP courses and programs
- * Staff support services listings which identify all NTU departments and phone numbers
- * Addition to the NTU customized mailing lists which now selectively routes NTU correspondence matched to specific customer profiles or requests
- * Needs assessment assistance; helping a site or corporation to create a training or education plan using the NTU system
- * Network management assistance to corporate subscribers
- * 24-hour daily satellite network support desk and control facilities
- * Complete video-tape backup of all NTU broadcasts
- * Accounting services; automated bookkeeping, pre-paid discount plans, credit services, financial statements and balance sheet reviews
- * Customer service staff available to assist with all customer needs
- * Equipment maintenance; per call, unit exchange, or scheduled on site

NTU strategy is to tailor its support services to the needs of the business and the requirements of its customer while increasing total penetration and revenue at all sites. The customer will be invited on an on-going basis to participate in identifying the services they need most to allow them to offer the optimum number of NTU programs and courses to their employees. Data resulting from these site specific or company-wide analyses will be used by NTU and the customer to establish action plans and goals to meet their education and training requirements. NTU staff will work closely with customer personnel to implement the plans. Knowledge gained from these activities will be used to improve NTU's support services to all NTU sites across the Network.

New and simplified administrative processes will be developed with customers to permit users to identify relevant NTU programs, order and receive them on demand, and be billed for them at the appropriate rate. These new processes are fundamental to the successful achievement of NTU's 1995 goal of enabling technical professionals and managers to access NTU resources on demand.

7. INTERNAL

NTU's strength is a function of the quality of its relatively small staff. Staff jobs are complex involving the many interfaces of suppliers and consumers. Responsiveness to the many demands of users and those providing the courses will be especially critical. Quality service will increasingly be the hallmark of NTU that sets it apart from other suppliers.

Individual performance plans related to the individual's job are the primary method of measuring individual performance. The detailed job descriptions for each staff member are updated in step with changes in job responsibilities. There will continue to be detailed descriptions of responsibilities for each functional area. Each staff member is expected and encouraged to continuously redefine the processes and interfaces employed by NTU. Staff meetings within departments and for all employees are scheduled monthly to facilitate this quality improvement effort. These staff meetings will continue to be an instrument for reviewing needs and problem areas, as well as the vehicle for the overall integration of programs.

NTU staff members will continue to be encouraged to participate in Total Quality Management education programs offered by ATMP. A staff committee will be formed to guide the selection of program relevant to NTU.

NTU managers will be encouraged to formulate a benchmarking plan for those functional areas which could significantly improve NTU performance as viewed by internal and external customers.

A plan is being developed to prepare NTU to compete for the Malcolm Baldrige National Quality Award when universities become eligible to compete. NTU will draw heavily on the experience of its subscribers who have successfully competed for this award. The total quality management approach will involve not only the NTU staff, but all institutions and personnel providing services to NTU users.

An over-arching strategy on Quality is to develop a quality management process for the entire range of NTU activities from the program suppliers all the way through to the ultimate users.

There will be further delineation of job responsibilities and assignment of responsibilities associated with each of the strategies of the Long Range Plan as part of the annual management-by-objectives approach used by NTU administrators. Specifically, the Academic Vice President will have responsibility for the strategies associated with the graduate program including the establishment of the short- and long-term action programs required to implement the strategies and achieve the associated goals and objectives. Similarly, the Director of the ATMP program will have the same responsibilities associated with the ATMP goals, objectives and strategies of the Long Range Plan. The Vice President of Marketing will have the staff responsibility for all the Marketing and Public Relations programs working with the Academic Vice President, Director of ATMP and the Chief Financial Officer. For each of the action programs established, time lines will be determined, along with a specification of the various action programs and the associated measurements to meet the goals of the Long Range Plan. There will be quarterly review meetings run by the President of NTU involving the associated managers assigned the responsibilities. The Long Range Plan will be revised as required.

8. INTERNATIONAL

NTU is taking a more aggressive approach in extending its reach internationally. With the growth and acceptance of distance learning systems, there is keen interest outside the U.S. in developing working relationships with NTU. NTU is recognized for its leadership in the United States and was instrumental in getting EuroPACE started in Europe. The interests extend from consultations to more formal partnerships. There have been discussions with groups in Australia, Brazil, Canada, Dominican Republic, France, Germany, Italy, Japan, Mexico, Poland, Southeast Asia, and Sweden, to name a few. Value to NTU and its stakeholders will be the main criterion in all negotiations. Value can be added to NTU customers and universities where there is the potential to exchange courses.

NTU currently makes its non-credit Advanced Technology and Management Programs available via air-expressed videotape to Corporate Subscribers for the use of their employees at locations outside of the United States, Canada, and Mexico where credit courses and ATMP are offered via satellite. In August, 1992, the following international sites are served:

NTU INTERNATIONAL SITES

Digital Equipment Corporation

Annecy-le-Vieux, France
Chatswood, NSW, Australia
Kanata, Ontario, Canada
Reading, Berkshire, England
Seoul, Korea
Solent, England
Tokyo, Japan
Unterfoehring, Germany
Valbonne, France
Varese, Italy

EMA Open Learning Pty Ltd

South Melbourne, Australia

E.I. du Pont de Nemours & Company

Seoul, Korea

General Electric Company

Mississauga, Ontario, Canada
Peterborough, Ontario, Canada

Hewlett-Packard Company

Barcelona, Spain
Beijing, China
Blackburn, Victoria, Australia
Boblingen, West Germany
Bristol, England
Central Hong Kong
Eybens, France

Guadalajara, Mexico
New Delhi, India
Penang, Malaysia
Seoul, Korea
Singapore
Taipei, Taiwan
Tokyo, Japan
Vienna, Austria

IAHE

Singapore

IBM

Bromont, Quebec, Canada

Instituto Tecnológico y de Estudios Superiores de Monterrey

Monterrey, Mexico

National Semiconductor Corporation

Bangkok, Thailand
Greenock, Scotland
Kowloon, Hong Kong
Lapulapu City, Philippines
Malaka, Malaysia
Penang, Malaysia
Singapore (2 sites)

NCR Corporation

Waterloo, Ontario, Canada

European Satellite: RAISAT - Europe's primary experimental direct broadcast satellite is Olympus. Many distance learning experiments share this satellite, which has a short life, high power and relatively few dishes pointed its way. Italy bought its own transponder with a special footprint (an ellipse along the Italian axis) dubbed RAISAT. RAISAT serves Italy, Malta, Austria, Switzerland, Eire, Germany, Holland, Belgium, Luxembourg, Yugoslavia, Albania, Greece, Hungary, Poland, Czechoslovakia and Romania. The operator is the Italian government broadcaster RAI, Radiotelevisione Italiana. Since October, 1990, to date, RAISAT has broadcast an educational schedule containing about equal number of hours from EuroPACE, Eurostep (a large university consortium with wide ranging programs) and NTU.

Olympus has been plagued with technical problems. Nevertheless, RAISAT in its second year of service has made more translations of NTU programs into Italian, French and German. Evaluation studies should be available in 1993. Future cooperation will be guided by the experimental results.

EuroPACE - NTU has been visited on several occasions by EuroPACE staff and, in the 1986-87 EuroPACE planning effort, NTU provided many planning documents. The 1991-92 EuroPACE catalog lists

29 courses in seven fields for a total of 180 hours of instruction which are delivered annually by satellite in Europe and produced in Europe.

Over the years, only two programs have been exchanged (bartered) and that in 1991. EuroPACE delivered the NTU-produced NATO Advanced Symposium on Superconductive Materials; NTU delivered a EuroPACE-produced international SPIE symposium on Optoelectronic Materials. An additional program exchange concerning international symposia on MOT is planned in late 1992.

NTU-Eurosud Foundation - NTU will continue to make every effort to cooperate with EuroPACE as we plan to develop NTU-Europe as a market-driven, shared satellite network. A feasibility study will be undertaken by a senior NTU faculty consultant in 1992-93 working out of a Paris office with NTU-Eurosud Foundation funding. We seek to create a European partner which shares the NTU mission and functions. Two-way exchange of programs that serve the advanced education needs of European and U.S. knowledge workers is the goal. An open, efficient administrative structure with many qualified suppliers should be governed by a European board that shares the NTU vision.

Japan - In summer of 1991, USAFOSR issued an RFP entitled "U.S.-Japan Industry and Technology Management Training", in response to legislation spearheaded by Senator Jeff Bingaman of New Mexico. NTU teamed with the University of Wisconsin-Madison, and a consortium EAGLE. This team was awarded two years of funding. NTU now offers technical Japanese language instruction, increased ATMP on Japanese technology management and a revised MOT curricula with an international component.

Canada - NTU was approached by staff of the Management of Technology and Innovation Institute (MTI), a non-profit, spin-off of McMasters University in early 1990. MTI has engaged Canadian Deans of Engineering and Business in a study in 1991-92. NTU staff has provided data and reacted to various drafts of business plans to create a Canadian network linked with NTU. Government funding appears to be a key in Canada. NTU has agreed to explore a joint venture.

Mexico - ITESM is a U.S. accredited, private university headquartered in Monterrey, Mexico. ITESM has installed a CLI SpectrumSaver3 system for ITV origination from campuses in Monterrey and Mexico City to 24 remote campuses. ITESM is an NTU customer and receives NTU DCV broadcasts directly.

ITESM System President, Dr. Rafael Rangel Sostmann, identifies faculty development as a key issue in Mexico and he estimates that Mexico needs 6000 engineering faculty by 2000. NTU will continue to explore ways to cooperate with universities in Mexico.

Latin America - NTU is exploring a USAID funded program which might provide five years of funding for a sister university network. Universities in Latin America would be linked to NTU member universities via a DCV satellite network on PanAmSat if support is obtained.

Australia - In 1987, NTU was approached by Ken J. Widdowson, an entrepreneur from Melbourne who operates Educational Media Australia (EMA) and another venture The Learning Network. EMA is a licensed distributor for the UK Open University and U.S. PBS videotapes and materials, and for many U.S. universities. In September, 1991, EMA and NTU signed an agreement, which is a modified version of a rather standard distributor contract for educational videotapes.

In June, 1991, NTU was contacted by Professor Ken McKinnon, Vice Chancellor of the University of Wollongong. McKinnon is the senior university administrator in Australia and chairs an all-university chancellors' interface with the federal government. McKinnon has assigned an innovative senior administrator to develop a business plan for a joint venture with NTU in Australia. Widdowson is cooperating and bringing marketing and broadcast experience to the study. NTU has provided data and background information. A Wollongong initiative is planned to begin broadcasting NTU ATMP courses in 1993 and involvement of other educational resources in Australia is planned by Wollongong to build a shared network.

Thailand - NTU was visited by the head of the USAID mission, Tom Reese, in September, 1991. This group now acts like a trade mission, rather than a typical AID unit. This switch recognizes the rapid

economic development of Thailand and broad scale goodwill toward the U.S. Reese discussed NTU with many university, government and industrial leaders in Bangkok. He assigned a senior staffer to work the project. A feasibility study may be funded by USAID in late 1992 to create a service in Thailand using NTU instructional materials.

Southeast Asia - NTU has entered into an agreement whereby IAHE will tutor NTU ATMP courses at locations in Singapore. The Intelsat satellite which serves Thailand also serves much of southeast Asia. A live teleconference to this area via DCV is planned in late 1992. We will involve several international NTU sites in the experiment. Funds will come from USAID-Thailand, Keystone Communications (an Intelsat resaler) and perhaps CLI for this demonstration. Live teleconferences using DCV can enhance other cooperative service arrangements based on videotape.

South Africa - Robert DeSio and Professor Marvin DeVries (NTU Chairman of MSE; U Wisconsin-Madison Chairman of ME) with an NSF task force visited South Africa in August, 1991. They were hosted by lead engineering educators and the Foundation for Research Development. This led to several visits to the U.S. by S.A. educators interested in creating a joint venture with NTU. At the present time, the head of the SA Engineering society, along with a board member of CSIR, SA's NSF, are preparing a feasibility study for creating an NTU distribution study in SA. A campus-based initiative using NTU MOT courses on videotape for local university credit is planned as a first step in 1993.

Eastern Europe - Satellite-delivered instruction is viewed by many as a necessary infrastructure investment to assist the democratization and economic development of eastern Europe, Russia and other former USSR areas. Numerous inquiries and study groups have approached NTU. We explore each potential development carefully and, of course, seek to participate in ventures which have potential to become meaningful long-term, two-way exchanges. The problems are massive, but the World Bank and many NTU stakeholders may be willing to make major investments.

Currently, NTU is cooperating in an "East-West Distance Education Project". The project was initiated during 1990 by the International Association for Continuing Engineering Education (IACEE) spearheaded by Dr. John Klus, the IACEE President and a professor at the University of Wisconsin-Madison.

Beyond exploring and forming active partnerships, NTU will participate internationally in conferences, seminars and symposia for the overall good of education, especially where distance learning is the central theme. NTU will ask for the Executive Advisory Board and others to help in fulfilling this part of the strategy. Finally, ATMP will encourage producers to continue to include foreign scholars in the short courses and seminar series where appropriate.

9. PUBLIC RELATIONS

Expanded public relation activities will enhance awareness of NTU at the national and international levels. These activities are part of a coherent public relations program involving:

- advertising and promotional efforts
- speaking engagements
- seminar and conference participation
- brochures, reports, catalogs, and other publications
- promotional videotapes and diskettes
- press releases
- trade shows
- video and audio teleconferences
- NTU meetings and conferences
- hosting of visitors at NTU Headquarters, member universities and customer sites
- special events

IX. EXTERNAL ENVIRONMENT

NTU's strategies are significantly affected by the external environment. Some of the most important factors are listed below.

- Knowledge worker concern for career security
- National concern for international competitiveness
- Increasingly global economy coupled with real and threatened loss of jobs in a number of industries
- Rapid change in technology
- Industrial and Government concern with technical obsolescence
- Emergence of new disciplines and specialties as well as growing emphasis on interdisciplinary approaches
- Decline in full-time matriculating U.S. graduate students in engineering and computer science degree programs
- A shortage of high-quality faculty in critical technical disciplines which will soon be aggravated by an unusually large number of retirements
- A strong move to large scale, multidisciplinary research with joint government and industry support of these centers, some involving several universities
- Creation of research funding for technology organizations sponsored by many cooperating corporations; e.g., Semiconductor Research Corporation, National Center for Manufacturing Sciences, SEMATECH, etc.
- Increased attention to system integration and quality with more work across traditional interfaces
- Flattening industrial organizations with fewer headquarter staffs and line managers
- Integration of educational and training strategies into overall corporate goals and strategies
- Wide recognition that continuing education must become an integral part of the job for working technical professionals
- Corporate focus on the needs for balanced programs in continuing technical education as well as training
- Corporate concern and requirement for cost-effective education
- Corporate trend toward use of external sources for meeting their generic continuing education needs to save dedicated resources for proprietary, internal education, i.e., dollars are more available than headcount
- Movement toward "outsourcing" education and training administration similar to earlier trends in data services, security and food services
- Dynamic change, development and acceptance of telecommunications and computer technology in education

- Growing numbers of universities and other suppliers using ITV and similar technologies for delivering education
- Obvious growth potential for NTU programs, and inevitable replication of the concept and application of the NTU model to other academic areas
- Implementation of new state-supported networks
- Dramatic decreases in the cost of workstations and networks, coupled with equally dramatic increases in workstation and network performance
- Growing international interest in creating foreign networks like NTU, with governments and international corporations taking the lead
- Recognition that U.S. engineering community has failed to build foreign links and thereby has neglected valuable expertise
- Growing international interest in arrangements with NTU

X. INTERNAL ENVIRONMENT

NTU's strategies are also affected by its internal environment. Some of the more important internal factors are listed below.

- Paper-intensive environment with broad dissemination of diverse mailings to members, users and prospects
- Complex set of interfaces, including member universities, and experienced and inexperienced receive locations, all requiring timely responsiveness
- Small staff administering complex operations that are geographically dispersed
- Delineation of management responsibilities implemented and continuously improved
- NTU housed in a modern building with excellent facilities for the staff
- Increased channel capacity to twelve channels providing much greater flexibility in graduate and ATMP offerings
- New telephone system with direct inward dial (DID) and voice mail
- Growing use and acceptance of electronic mail and conferencing, as well as FAX, by NTU faculty and students
- Active Site Coordinator Steering Committee representing several major corporate users
- Very participatory and active Board of Trustees and Executive Advisory Board
- Important role of the Academic Executive Committee in the overall quality enhancement of the graduate programs
- Extensive use of *ad hoc* committees, especially from Executive Advisory Board, focusing on high-priority needs such as international programs, management of technology, educational technologies and marketing
- Administrative Contact Steering Committee representing a key function to improve administrative operations with NTU institutions
- Recently reorganized NTU Association of Alumni and Alumnae supporting recruiting and retention efforts for credit programs for graduate students
- Currently lack relational student and course database
- Vertically integrated organizations for academic programs and for non-credit short courses
- NTU staff awareness of the need for quality in all operations and the need to continue to develop processes for monitoring and improving functions
- The NTU Academic Executive Committee developing academic policy and providing oversight for NTU degree programs
- Dedicated TV engineers constantly improving broadcast quality

XI. STRENGTHS

Because of the nature and performance of the institution, NTU has some very significant strengths.

- Growing visibility and recognition, both nationally and internationally, as a high-quality provider of advanced education for technical professionals and managers at the work site
- Experienced leader in using satellite transmission and associated educational technologies in delivering education via complex networks using modern digital compressed video
- Advantages of cost effectiveness of scale by operating, by far, the largest open university DCV network via satellite in the U.S.
- Broad support of faculty and administrators at leading universities of the NTU vision and mission
- Extensive sources of education with many potential suppliers and distinguished scholars integrated into cohesive programs managed by NTU
- More flexibility than traditional universities in establishing new degree programs, especially those with interdisciplinary courses
- Ability to respond in a timely fashion to the needs and requirements of subscriber organizations with quality education provided from diverse sources
- Very high quality students who are practicing professionals with the ability to challenge NTU instructors
- The potential to serve as the world model for the delivery of education to remote students via telecommunications technologies
- National service allows students who change job locations to continue their degree program
- Have the support and participation of many of the world's leading high-technology organizations
- Broad support of leading faculty from 45 member universities

XII. WEAKNESSES

Because of the nature, age and early performance of the institution, NTU has a number of real or perceived weaknesses to address.

- Customer expectations stretch, and often exceed, NTU human and financial resources
- Business depends heavily on site coordinator
- High percentage of relatively inactive sites and low enrollment penetration per site
- Very low margin compared to other marketing and distributing systems of instructional materials
- Being new, NTU degrees may suffer in public perception of degrees from established traditional universities
- Continuing skepticism by some relative to distance learning with a perception that it is inferior to resident programs (with the growth and success being realized by NTU and others, this is diminishing)
- With no traditional research arm, NTU suffers in competition with traditional universities for grants and gifts
- Limited penetration of small and medium-sized organizations
- ATMP courses do not map into a traditional training curriculum structure so that customers and users can relate to these offerings
- Need for a comprehensive computerized student and course database
- Need to strengthen student academic advising and general career counseling by adding at least one general advisor to the NTU Student Services staff
- Private university with no endowment

XIII. FIVE-TEN YEAR HORIZON

The 1990 decade is predicted to be one of dramatic change for technical professionals and their employers. Frank P. Doyle, Senior Vice President-Corporate Relations Staff of General Electric Co., foresees the following:

Even if the competitive threats of the Nineties are more subtle, they will be no less serious. To be sure, the top-down Eighties are over. That era is ending: that power relationship is shifting from employers to employees, even with the continued need both for companies and economies to restructure and globalize.

Power will go to people: power and career security will go to employees with adaptable minds, flexible skills and portable pensions; power and profits will go to companies smart enough to make their workplaces, work practices, and training programs the most attractive; power and wealth will go to nations wise enough to invest in their children and schools quickly enough.

The convergence of demographic contraction and technological advance will give capable, constantly trainable knowledge workers -- whether they work in offices or factories -- the greatest degree of security of all: career security. Job security -- confidence in the same kind of job in the same company in the same industry -- will be viewed increasingly as anachronistic by employees through the next decade. The successful companies of the Nineties will invest as aggressively in human resources for productivity as the successful companies of the Eighties invested in cost-cutting, product and process technology.

NTU customers in the U.S. continue to restructure rapidly to meet the challenge, and we are beginning to see rapid changes in Western Europe, Australia, Latin America, Canada and Mexico. Eastern Europe and the former Soviet Union provide immense opportunities. The challenge to develop successful partnerships or joint ventures is, of course, different in each area. But the basic needs of the engineers, technical professionals and managers for advanced career-long learning opportunities are remarkably similar everywhere. The challenge to NTU is to find ways to listen and respond to the individual learner's needs.

Technology is advancing very rapidly to enable the task cited above to be attacked systematically. Telecommunications and computing are merging. International broadband standards are emerging. Deregulation and lower costs are putting this new technology in the hands of users. NTU will seek long-term relationships in each area of the globe which will enable NTU to approach its vision and mission.

Because of NTU's leadership, experience and maturity, others who want to enter the market for delivering education at all levels will offer a new business opportunity dealing with the planning and implementation of distance learning systems. This new business venture for services can represent a new and exciting direction for NTU. It will be feasible as long as NTU stays ahead of competition in exploiting the technologies and moving into other areas. Publications, as well as contractual consulting services, can become a part of this new venture with the staging occurring during the next five years. The opportunity for such services would also be very attractive in the international scene. The ASEAN countries, Peoples' Republic of China, and Korea have all established education as a primary national strategy. The establishment of free zones in Central America represent tremendous educational opportunities for consulting and contractual services since the use of educational and distance learning technologies will be essential in providing efficient and cost-effective education.

In the 1997-2002 time period, U.S. higher education may adopt networking and sharing as a strategy on campus. The last two decades have shown that library resources and specialized computing resources are best managed in this fashion. Going it alone is out; networking and sharing are the mode. When

* Frank P. Doyle, *People Power: The Global Human Resource Challenge for the Nineties*, World Management Congress, New York (Sept. 23, 1989).

faculty realize that specialized graduate faculty resources are also best managed by a networking/sharing strategy, NTU can be a major network and facilitator for engineering, science and management faculties. The new NTU DCV network is now available to member schools at nominal rates to encourage exploration of this concept. NTU will be responsive to this fundamental shift in higher education.

Engineers will increasingly work in self-directed teams. These flat organizations will require better communication skills, closer ties to customers and broader managerial skills of all professionals. NTU will respond by providing appropriate instruction to enhance the needed capabilities. Management of technology will take on a broader significance, and NTU will develop modular instruction to serve the enlarged participant pool. By the year 2000, NTU services in this area should be as large as the current technical track. We are actively seeking major grants to accelerate the development of a School of Productivity and Competitiveness.

New information services are also needed in today's flat organizations. NTU plans to offer specialized economic forecasts to executives initially on a quarterly schedule through an arrangement with the Wharton School. NTU is developing programs to enhance technology transfer. New product/service information prepared by new ventures of the trade press will be delivered with corporate sponsorship. The proposed science magazine of the air, the Science and Engineering Television Network, will be tested over the NTU network. By 2000, NTU will be providing its users with a much wider range of information services, and some of these may be available at little or no cost because of sponsorship.

State initiatives such as Michigan's MITN are likely to increase. NTU will work hard to demonstrate that cooperative approaches, such as NTU and MITN are now undertaking, is the preferred strategy. NTU's ability to serve knowledge workers at small and medium sized firms should be greatly enhanced in these joint networks. NTU experiences with technology-based, start-up firms over the last two years in the Economic Development Administration program makes us sensitive to the special needs of this market. We will work with MITN to develop a programming segment which is especially responsive to engineers and managers in small and medium sized firms. This effort should also appeal to Canadians.

There will be continued penetration into the large corporation market, as NTU pursues its target account marketing strategy, to increase the number of new major accounts, to increase horizontally the number of sites for major corporations and to increase vertically the penetration at each site. NTU should have active involvement with 250 of the major technical organizations, including many drawn from FORTUNE 500, by the end of the 10-year period. There will be more than 1200 active sites receiving NTU programming and revenues in 2002 should exceed \$42 million.

NTU Feasibility Study
US Agency for International Development

Final Report
February, 1993

Appendix B - Contact Reports

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Michael Klipp
Company: AT&T, 74 Soi Lang Suan, BKK
Telephone Number: 254-4026
Date of Contact: 30 November, 1992

Report:

We met at the AT&T offices at Soi Lang Suan. Michael was very pleasant and happy to talk. He is in charge of the training for their people. He stressed that they have a real need for the vocational education level so that they can train a skilled labor force. I asked him about the need for education at the level that NTU offers. He wasn't quite as clear on the need for that.

He mentioned that cost would be a major factor. I said that the cost would be too high for individual Thai students to afford it, and that it would need to be supported by companies. I asked if AT&T would be willing to provide the support that companies in the US do. He said he thought they would if it provided them the appropriate corporate support. It would need to go to the people that they want it to go to. I think he meant that it would go to their customers and would support their technology that they are selling. I will try to clarify that when I meet with Steve Tsitouris next week.

He thought this would be a good tool to augment existing programs at Thai universities.

He asked about the feasibility of contacting existing NTU customers, and then expanding their existing program by offering them the international component for an additional percentage. My reaction to that is that the companies pay by the course now and need a customer support unit at each site, so I don't know if that is a cost saver. However, I believe that the existing customers can be good public relations units for NTU and the corporate HQ may have an interest in seeing that this gets overseas.

He made the comment that interactive TV has limitations in Thailand because the Thai students don't like to read. If they have to read what is on the screen, and then retain it for later tests or quizzes, they don't like that. I am not sure he has a large data base on which to draw that conclusion, but that is not the method of instruction of NTU. Also we would be targeting a higher level of student than I think he was talking about.

Appendix B - Contact Reports
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The name of the person who oversees his training operations is:
Frank Zabinski, Dublin Ohio, (614)764-5130,
E-mail: ATTMAIL!CQUXI!FRANKZ

JDN:jd

SB

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Steve Tsitouris, President
Company: AT&T
Telephone Number: 254-4026
254-4025
Date of Contact: 9 December 1992

Report:

I met with Steve in his office, and thought that the reception was rather cold. He had to come out of a meeting to talk with me, and that may account for it.

He indicated that he was familiar with NTU, and I discussed it in more detail. He was not fully aware of the programs that we offer, and he was not aware of the ability for people to get a MS degree at their place of work. He did seem to become more interested in NTU as our conversation progressed.

He didn't perceive where he would have much interest in participating, nor did he think his people would utilize NTU courses to a large extent.

He said that his engineers looked at being sent to the US for training as a perk. However, he said that he didn't like to send them for more than 4 months because after that they lost their effectiveness in Thailand because they lost their contacts, etc. He recognized that a program offered through NTU could have some use for them after that.

He told me that one company that we need to contact is Shinawatra Computer Co. Shinawatra won the concession to place Thailand's first satellite into orbit, and they will have the uplink and downlink capability. The man he said I need to contact is Chirdsak Kukiattinun, General Manager. He said to use his name when I contact Chirdsak. (I got a copy of their annual report but that didn't have their phone or address. I think that because of the lack of time at this point in the project that this contact will need to wait until next time. Shinawatra has the concessions for the 900 MHz cellular phones in Thailand and also the cable TV. They are big supporters of education for their employees and spend about 10 to 12 million Baht per year in scholarships for their employees to attend King Mongkut Institute of Technology at Ladkrabang (KMITL).

My general feeling is that AT&T will not really be one of the primary movers in the development of an NTU program in Thailand, but if it becomes a respected type of professional development for the engineering management in telecommunications, their people would use it. However, we can't count on their support to get it up and running.

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Dr. Ricardo (Ric) P. Pama, V.P. Acad. Aff.
Dr. Alistair North, President
Dr. Nicanor (Nic) C. Austriaco, Dir. Cont.
Ed. Ctr.
Mrs. Marinette S. Forbes-Ricarte, Program
Specialist I

Company: Asian Institute of Technology
G.P.O. Box 2754
Bangkok 10501 Thailand

Telephone Number: (662) 516-0110-44
524-5002 (Direct line for Pama)

Date of Contact: Nov. 25, 1992

Report:

I met initially with Ric Pama and Alistair North. They are both very enthusiastic about the possibility of working together. They see the NTU offerings and cooperation as being of benefit to the Continuing Education efforts of AIT.

I met next with Ric and Nic. They seemed to be of the impression that we were interested in offering their courses by satellite, and I attempted to clarify that the NTU offerings will in fact, be supplemental to their offerings. I think they understand that, but I don't think they really are on the same "wavelength" as us. Nevertheless, I think that their cooperation and enthusiasm is important to what we want to do.

Had a tour of their new telecommunications lab. That has been donated by Nokia of Finland. It is a nice lab, and they are getting into the fiber optics area. This facility could be of some usefulness if we needed something visual for training.

We discussed the cooperation with Thai Universities. We agree that it will be important to have good relationships with them. We may want to use some of their faculty for tutors, we may want to offer courses at their sites, (particularly Chulalongkorn Univ., "Chula"), and we want to stress that we would not compete in any way with them. Also, some of the NTU offerings could supplement some of their programs in specialty areas.

We had lunch with Alistair, Ric, Nic, and Dr. Phien, chairman of Computer Science. Phien seems to be quite smart.

In conclusion, President North agreed to make the first contacts with the Thai Universities. In order to facilitate that it was agreed that he will host a dinner at a Chinese restaurant at which I will be the guest of honor, and will have the opportu-

nity to present the concept of what we are doing. Invitees to the dinner will include Presidents of Thai Universities, USAID personnel, and AIT people. Probably about 10 people. A contact report will be prepared for that which will list all in attendance.

AIT offered to make available some of their staff to help me make appointment, etc. That is essential to have some Thai speaking staff who can make and receive phone calls. However, Tom Reese, III, Mission director of USAID, subsequently offered to have their staff do that for me and Peter Deinken's secretary will do all that for me. Therefore no need to have AIT staff do that.

One word of note is that AIT is really a long way out of town. My appointments are all in Bangkok near the hotel and USAID, etc. When I go to AIT it takes about 1 to 2 hours depending on the traffic. A cheap taxi costs 800 Baht round trip (\$32.00). AIT is not very conveniently located from the standpoint of being a center for the feasibility study. It would work well as a downlink and administrative location for NTU if the program is up and running. It may be desirable, however, for NTU to have an "in-town" office to make contacts, and be responsive to clients. That is something that would need to be assessed.

We discussed an issue regarding the recognition of degrees. Early on at AIT, the Thai Civil Service Agency recognized the AIT as being equivalent to a US masters degree. They said that anyone who is hired will have the same starting salary as one who has a degree from a US university. We will need to have some form of recognition of the CEU units and the degree if we get into that. Of course the argument can be made that NTU is a US degree. However, the issue of granting degrees in Thailand and who grants them, and the regulation by the government (Ministry of University Affairs) is something that needs attention farther down the road.

JDN:jd

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NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Alastair North
Company: AIT
Telephone Number:
Date of Contact: 11 December 1992

Report:

Dr. North arranged a dinner so that I would have the opportunity to meet with the presidents of key universities and to discuss NTU with them. Unfortunately, because of previous commitments and the fact that the traffic in Bangkok was unusually bad that day, the only president that attended was Prof. Iam Chaya-Ngam, President of Sukhothai Thammathirat Open University. Also present were:

Alastair North, President AIT
Iam Chaya-Ngam, President Sukhothai Thammathirat Open U.
Thomas H. Reese, III, Mission Director, USAID
Peter Deinken, Program Director, USAID
Suvit Yodmani, VP for Development, AIT
A.B. Sharma, Chairman, Dept. Telecommunications, AIT
Nicanor Austriaco, Dir. Continuing Ed. Ctr.
John D. Nelson, NTU

We discussed the concept of the pilot project, the form that it would take, and various aspects of it. I discussed the STOU with Prof. Iam and we discussed the differences between NTU and STOU.

Since the beginning of STOU 14 years ago they have had about 150,000 graduates. Ramkamhaeng University is also an open university in Thailand and they graduate about 15,000 students per year.

I asked about tuition fees. For the normal Thai universities tuition is almost free if they get admitted. For SASIN at Chula the cost is about \$8,000 per year. At AIT the cost is about \$10,000 per year. Thus it is evident that there is a demand for quality education and they are willing to pay for it.

The rest of the discussion was generally centered around general concepts.

JDN:jd

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Dr. Kamchad Mongkolkul, Director Petroleum
and Petrochemical Program,
Dr. Kanchana Trakulcoo, (Ms) Asso. Prof.
Dr. Somchai Osuwan, Professor of Chem. Eng.
Company: Chulalongkorn University
Telephone Number: 215-2602, 215-0871/3, X3908
215-4459 (FAX)
Date of Contact: 4 December 1992

Report:

Peter Deinken and Rita Klees of AID were also in attendance at the meeting. We initially spent a fair amount of time discussing the NTU program, and what the format might be, and how the Chula faculty would interact, and other details. He was very concerned about costs. He wanted to know if the cost per student would go down if there were a large number of students taking a course. I said that I thought that it would.

Dr. Kamchad expressed the opinion that he thought there would need to be a faculty member to act as a tutor at the receiving end. He was very interested in participating and having his faculty work with it.

He discussed the new Technology center that Chula will be building. It will be on Rama 4 road near Henry Dunant St. When the new metro rapid transit system goes in there will be a stop right there. This center would have two high rise buildings that would lease space to high tech industry. It will reserve three floors or so for the university to use. He thought that would be a perfect place for NTU to be located. That may be true but it is quite a few years down the road. Nevertheless, it demonstrates the eagerness of Kamchad to be involved.

He also mentioned that the new Petrochemical building will have good space that could be outfitted to allow for ITV. NTU could offer courses at that location. It has the definite advantage that it is centrally located.

He said that even though he was enthusiastic about it, the one who needs to be a central figure is the Dean of Engineering. We need to make that contact. (The President, Dr. Charas was invited to the AIT dinner but was unable to attend).

JDN:jd

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Tarworn Yaowakun
Company: Communications Authority of Thailand (CAT)
Telephone Number:
Date of Contact: 16 December 1992

Report:

Peter Deinken and I met with Taworn over lunch with the intent of discussing the way in which NTU would interact with CAT. Tom Reese had suggested that they may be a good neutral partner with whom to work. Their name had come up several times in the conversation with Loxley over lunch the previous day (hence, the interest in meeting with Tarworn. The meeting was set up late Tuesday afternoon and Taworn was anxious to meet with me.)

Taworn knew about NTU, and was enthusiastic about it. He said that we should set it up as a regional effort, and if we want, we can utilize only the local (BKK) part right now. However, when we want to move into a more international arena and include Cambodia, Viet Nam, Malaysia, Singapore, etc. the structure will be in place.

He said that CAT can provide both the uplink and downlink within Thailand. We could lease a block of time on the satellite for a continuous period over a year or more, or we could just lease a finite short period of time. He indicated that the facilities are in place so that we can do that almost immediately.

We discussed Shinawatra. Their relationship with CAT is as a competitor. Taworn indicated that Shinawatra does not yet have the slot for the satellite that they intend to launch next year. Also, they will be only domestic, whereas CAT has international capabilities. He said that CAT and Loxley will be in partnership for the uplink/downlink in Chiang Mai. He said that they will be able to use that even if there is not an emergency even though its primary purpose is to serve as a back up for Hong-kong.

JDN:jd

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NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Doris Wibunsin
99/2 Soi Pongsawat
Sananbin Nam Road
Nonthaburi Thailand 11000
Company: Fulbright Foundation (Former Director)
Telephone Number: 588-2022
580-0142 (FAX & Phone)
Date of Contact: 9 December 1992

Report:

I had lunch with Doris at the hotel. She was in charge of the Fulbright program here in Thailand until July of this year. She was a Peace Corps worker here from 1963 to 1966. She went back to the US and finished her Master's degree and came back to Thailand. Her husband is Thai and was a judge previously. She is a delightful person and has good contacts with the Ministry of University Affairs. She is a good friend with Subin from the days when he was the Minister of University Affairs, and is also a good friend with Wichit Srisa-Arm, the Permanent Secretary to the Minister of University Affairs.

I described what I was here for and NTU. She was very enthusiastic and offered lots of advice. She believes that this needs to be done through the Universities, and she knows all the universities around and the people who are involved in them.

She thinks we need to get recognition from the Civil Service commission, and said to contact Khun Udon Boonprakob.

We discussed the program, our interaction with the industry, some of my preliminary ideas, etc. In general, she thinks this should be a university program that is available to all students, and the universities need to work closely with the industry. I don't agree with her that it shouldn't be an industry program, but I think these thoughts reflect her university connections and her personal ideology of keeping academia to the academics, and not letting industry interfere too much in academic matters. (That is just my impression and I may be wrong).

Doris is a good resource person. She was very enthusiastic about the potential for NTU type programs in Thailand. She is a good ally and may be a potential candidate to help us with future efforts in Thailand.

JDN:jd

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NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Jenny Sun
Max Sun, President
Company: ITV
Telephone Number: (818) 883-6333 (Canoga Park, CA)
Date of Contact: 3 December 1992

Report:

Doyle Stout of NYNEX called me and invited me to have lunch with Jenny and Max Sun of ITV. They market a television product that works over the phone lines. It is really an informational TV channel. It has weather, news, the yellow pages, a dating service and several others. We watched the demo on the TV in the business center of the hotel and then went back to lunch. I had to leave early because of another meeting. It was interesting but not of significance to the project.

JDN:jd

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Dick Leary
Company: F.L. Kleinberg & Co.
Telephone Number: (303) 442-6794 (O)
(303) 443-7127 (H)
(303) 442-3287 FAX
Date of Contact: 3 December 1992

Report:

Dick Leary is based primarily in Bangkok although his company is in Boulder Colorado. He is a market specialist and basically what he does is to advise people on how to do business in South-east Asia. He could be called a matchmaker in that he helps to get American companies partners in the country in which they are going to do business.

We discussed NTU and I told him what we were exploring. He then explained what he does. He is going to think about it and get in touch with me in Colorado to let me know if there is anything that he thinks he has to offer us.

JDN:jd

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Dhongchai Lamsam, President
Barbara Buranasilpin, VP Business Dev.
Company: Loxley (Bangkok) Limited
Telephone Number: 221-6121, 225-0199, 225-9711, 221-5111
Date of Contact: 3 December 1992

Report:

The Loxley Company is about 50 years old and has a long and interesting history. It started as a trading company, with Thai and English partners. Dhongchai's grandfather was one of the founders of the company.

Loxley is a major owner of TT&T which has the contract to provide the 1,000,000 lines for rural Thailand. (See contact report of Eric Glasscott).

I discussed NTU and they both were familiar with it and the courses. They are interested in being a partner in offering NTU services. They are, I believe mostly interested in being the broker and contact for NTU in Thailand. We discussed the difficulty that a foreign company has in getting through the red tape in the government especially when it comes to telecom and up-links/downlinks, etc.

Loxley also has a downlink facility in northern Thailand near Chiang Mai. However, I think this is an emergency backup for Star (Hong Kong) TV. Whereas I thought that this could not be used except in an emergency, Dhongchai assured me that it can be.

I asked if they had an interest in using NTU courses to help train their staff. They said "yes, that too". I think their main interest is in marketing NTU.

Dhongchai and Barbara have set up a lunch for next week with some other IIT alums to meet me. Peter Deinken is also invited.

JDN:jd

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Dhongchai Lamsam
Barbara Buranasilpin
Chusak Direkwattanchai
Oi-tep (?)
Company: Loxley (Bangkok) Limited
Telephone Number:
Date of Contact:

Report:

Dhongchai hosted a lunch for Tom Reese, Peter Deinken, and me. We had some very good and frank discussion.

Dhongchai thought it was very important for us to offer the degree program. Without that the students wouldn't be inclined to go through the trouble of taking a course. He did acknowledge that companies would be interested in providing specialized training for their employees.

They apparently have very good relationships with CAT and believe that they are in a unique position to offer us services in getting the regulatory process worked out in regard to satellite uplink/downlink. (I don't think that Shinawatra agrees with that.)

We talked about their project and the installation of the million lines upcountry. They will use fiber optics, microwave and even satellite he said.

JDN:jd

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Dr. Wichit Sri Sa-Arn
Company: Permanent Secretary, Ministry of University
Affairs
Telephone Number:
Date of Contact: 8 December 1992

Report:

Also present:
Porntip Kanjananiyot (Ms.)
Wilawan Jaruariyanon

The meeting was cordial but fairly stiff. Dr. Wichit seemed to know about NTU. He supposedly started Sukhothai Thammathirat Open University in Thailand, and therefore is an advocate of distance learning. I described what we were investigating, and he was interested. He said that he was in support of what we wanted to do.

He stressed two main points.

1. The cost must be low enough for students to be able to afford it. I explained that such would probably not be the case and industry would need to support it. He didn't seem to like that, and seemed to want industry to underwrite it but not have it as an exclusive for themselves.
2. It should be done in conjunction with the universities. This reflects his close ties with the universities and reflects his academic background. We discussed the need for tutors and the need to involve the Thai faculty. He said that he thought it was essential to have tutors at this end, and talked about modifying the courses (tapes) for language and to be pertinent to Thailand. (As far as I am concerned, this would be an infringement on copyrights, and we would lose quality control. I think that if they start to tamper with the tapes, such as dubbing in Thai language or revising what is contained in them, it would be a disaster.)

I have learned subsequent to the meeting that he is a major advocate of "internationalization" of higher education. Technology University in Korat is a project in which he is very interested.

JDN:jd

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Khun Amphon, Deputy Permanent Secretary
Company: Ministry of Transport and Communications
Telephone Number:
Date of Contact: 7 December 1992

Report:

Khun Mahidol who is the Permanent Secretary of the Ministry of Transport and Communications was on travel and didn't have time to meet with me. He suggested that I should meet with Khun Amphon who is his deputy.

I explained NTU to him and left some information with him. We did have a good discussion. He believed that what we are trying to do has some value, and could be a valuable resource to Thailand. I know he was not just saying that to make me feel good. He was very candid about not being able to offer programs live because of scheduling, etc. However, he believed that tapes would be a good medium.

He also was supportive in general, but didn't have much of a stake in this. He doesn't control downlinks or anything like that. He said I need to contact CAT.

JDN:jd

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NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Prof. Yongyuth Yuthavong, Director NSTDA
Dr. Krissanapong Kirtikara, Deputy Dir.
NECTEC, Nat. Electronics and Computer Tech
Ctr.
Telephone Number: 276-1314/7 (Yongyuth)
247-1465; 248-8078/84 (Krissanapong)
Date of Contact: 3 December 1992

Report:

Peter Deinken and I met with Yongyuth and Krissanapong at Yongyuth's office. We discussed NTU the format, and details such as that. Yongyuth and Krissanapong are both very strong supporters of this concept. Their main area of interest lies in Informational Technology (IT). i.e., computer science, software engineering, etc.

They talked about how NSTDA could interact to revise courses to be most useful for Thais. This could include dubbing in the Thai language. (I didn't say anything contrary to that, but my philosophy is that we don't want anyone doing that because we don't have control over what is being said in Thai, and we don't know if the interpreter comprehends what is being said in English. I have had experience where interpretation was done by others and what comes out is not quite what went in. Also it detracts from the international nature of the course.)

They noted that NSTDA has a responsibility to bring the latest technology to Thailand, but they are not a degree granting body. They would want to work closely with universities.

We discussed the granting of CEU's. They noted that courses need to be "measured against international yardsticks". NSTDA can set up that yardstick. This must include both the time involved and the course content. For example, one would not give the same credit for a three hour course on welding that one would give for a three hour course on total quality management.

They are interested in Thailand being a center for a multinational center in higher level training. They are interested in involving Malaysia and Singapore. NECTEC is currently serving as the secretariat for a multinational organization in this area. Thailand is determined to be a Human Resources center to Southeast Asia.

Krissanapong was very interested in the tutorial process as a part of our offerings. He is concerned that just sending tapes over may be just a stale TV program. (I think that depends on

the instructor. If the instructor can teach on tape it can be great. For example, we get a major part of our entertainment over the TV. Bob Newhart doesn't have a tutor in every home. However, I think that a live video - conference will be a great enhancement for any program that we do. Even if we don't do our courses live, the fact that we could shows that we have the technology.)

Krissanapong said he would like to see a 3 credit course taught as a pilot project. They said that NSTDA could sponsor that. They indicated that the money is there for the Thai government to sponsor something like this.

At the end of our meeting, Yongyuth and Krissanapong set up a meeting that will take place on December 15 that will include about 30 people from the IT industry. They mentioned IBM, DEC, HP, etc.

In general they are very enthusiastic about this and see it as being a way to bring Thailand to the forefront of the human resources in high-tech.

JDN:jd

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Peter Spinney
Company: NYNEX
Telephone Number: 254-8470/4
254-8475/6 FAX
Date of Contact: 9 December 1992

Report:

This was a follow - up to the lunch meeting of yesterday. Doyle Stout joined us to start.

They first summed up our discussion of the previous day and said that what we need to do is get a pilot program going, target a narrow group of people, and do a very good program to start.

Peter and I moved to his office to discuss some more details by ourselves. He told me about the program that TelecomAsia is developing. He said that Thongchat wants to develop a central training center in Thailand similar to the one that NYNEX operates in Marlboro, MA. This would be a part of Telecom Holding Co. In this way CP would retain it when TelecomAsia transfers to TOT.

He told me that Bob Gallagher has put together a plan for training for TcA (TelecomAsia). Bob is retired from NYNEX and now is an employee of TcA. There are a number of people such as that. They are employees of TcA, and owe their first loyalties to TcA. Nevertheless, they have strong links to NYNEX. Bob used to run the training center at Marlboro for NYNEX. He is a key man in the TcA training activities.

There will be a four week offering of a program from Marlboro. I don't know if this will include bringing someone here from Marlboro, or if they will send students there. Peter said he has a request to put together a contract to send 30 people over to Marlboro, and he is working on that now. Also he was describing some of the problems they have run into in bringing one individual over from there so I know they are considering that as well.

NYNEX is going to bring a Science and Technology laboratory to Thailand. This will migrate to TcA eventually. NYNEX is interested in being closely involved in the activities of TcA, both because they have a major financial investment in it, but also because they want to have input into the standards that are developed for the telecom industry here.

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One big question is whether or not we can offer courses from the NYNEX training center through NTU satellite format. I think that would help to get NYNEX to put lots of support into a venture here. A question with that however, is whether that would be a limiting factor to NTU. Also there is the problem of doing transactions between regulated (NYNEX in USA) and non-regulated (NYNEX SIAM) arms of the same company.

Information: Peter and Doyle work for NYNEX Network Systems (NNS) which is the international arm of NYNEX. They started a company to do business in Thailand which is NYNEX SIAM. This is a part of the Worldwide Services Group. The President of Worldwide Services is a VP of NYNEX.

In general NYNEX is very supportive of our venture. They want this to be a major player in the training plans of TcA. In this way they will ensure a larger piece of the action. (Even though they own 15% +/- of TcA, TcA may buy systems, etc. from other entities. Peter was telling me about how they lost the contract for the computer operating system to Bell of Canada).

As I left he said that NYNEX would participate, and even though he didn't actually make a commitment for financial support I think he came as close to saying that as one could expect at this stage of the game.

JDN:jd

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Paul Russell
Rutorn Nopakun
Company: Pacific Legal Group
Telephone Number:
Date of Contact: 16 December 1992

Report:

I had originally set the meeting up with Paul. He invited Rutorn who is a Thai lawyer with the partner firm of Paul's. Rutorn is very knowledgeable about copyright law's and has had experience in the area. He has represented a few clients who have brought legal proceedings against defendants regarding protection of intellectual property rights.

We first discussed the fact that the NTU tapes would not have the same public appeal as tapes of popular music or movies. Also they would not have the same public market as the popular software on the market.

It was basically concluded that if NTU licenses a company as a site subscriber, they will probably provide a sufficient amount of protection just out of their corporate integrity, and the desire not to have any legal proceedings taken against them.

In the event of any evidence of copyright infringement NTU would have the ability to initiate legal proceedings in Thailand. For example Educational Testing Service (TOEFL) is currently suing a local tutoring school for infringement of copyright and trademark. They have no problem with the jurisdiction.

The problem with bringing suit is that the Thai courts tend to favor a Thai defendant over a foreign plaintiff. There have been cases where the original verdict was overruled by virtue of loopholes. There have been almost no cases where a foreign plaintiff has been successful against a Thai defendant. Motion picture export companies have brought several suits and they have been thrown out in the Supreme Court.

The law was promulgated in 1978, and it follows the guidelines of the Berne convention. It is ambiguous in some areas but is very explicit and adequate in the case of audio-visual materials. It will be revised in the near future to be more explicit in including computer software.

If we had a Thai company and the defendant is Thai we would have a better chance of winning the suit. In the case that the owner of the copyright is Thai and the defendant is Thai, the Berne

convention does not apply and many of the loopholes that the justices have invoked to be favorable to the Thai defendants do not apply.

NTU could set up a Thai company under the Thailand-US Amity agreement. I said that NTU probably would not want to sign over the copyrights to that entity, however.

The most promising approach appears to be a course of action in which in the case of infringement, NTU would initiate legal proceedings and then attempt to reach a settlement out of court. This would be tantamount to winning the suit by requiring the defendant to pay some amount, and it would demonstrate that NTU would not tolerate illegal copying, etc. Companies who are licensed would want to avoid any situation such as that since it would reflect badly on their professional integrity. This has been done in many cases and Rutorn seemed to think it is successful in deterring illegal taping, especially for something with as little "mass appeal" as NTU tapes.

The general conclusion was that if we set up the way of doing business properly, (e.g., licensing to companies) we can provide virtually the same degree of protection that we have in the US. We would have legal recourse, and although we may not be able to win in court we can win through out-of-court settlements.

JDN:jd



NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Paul Russell
Company: Pacific Legal Group
Telephone Number:
Date of Contact: 16 December 1992

Report:

Paul and I met separately after our meeting with Rutorn. Paul is in the process of setting up a training program in the area of business courses. He has a friend who has a course that meets biweekly for two days over the weekend for an entire 6 month period. They charge about \$3,500 to \$4,000 for the 6 month course. The attract about 50 students each time. The students are business people (men & women, mostly Chinese Thais) who want to develop business skills. They are in the age range of about 40 yrs +/- . The course also acts to some extent as a "networking vehicle" enabling them to make contacts within the business community.

There is a need for a similar program in English. Paul and the other individual are working on trying to put that together. He expressed great interest in using NTU tapes. I said that I would investigate the potential business courses that may be of interest. I left him a NTU bulletin but unfortunately, I had given away all of my copies of NTUplink.

He has contacted Jack Kasarda of the Kenan business school at Univ. North Carolina. He has also expressed an interest in working with Paul on this.

I described the way in which I conducted CE655 for the Colorado School of Mines this semester. He said that may be a good format for his course. If students took one or two three credit courses, he could hire some local people (there are a lot of graduates from the Thunderbird business school in BKK who he knows) who could serve as tutors. Students could view one or two hours of tapes and then the tutors could discuss the tape, or provide case histories to put it into local perspective for the next hour or two. This could be repeated for the next two tapes, etc. If they meet biweekly, two courses would provide 12 hours of tape each weekend they meet. Also selected programs from the ATMP or as listed in the NTUplink would serve well.

We discussed the management courses that are listed in the bulletin. Some of those seemed to be of interest, and pertinent.

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This program would be an excellent part of the pilot program. We should have some courses that would be directly applicable, it would provide excellent demonstration, it would serve as a means of working out many of the "bugs" in the system, and the intellectual property rights would be protected by Paul Russell himself.

I said I would respond to him quickly with a memo to describe the modus operandi of my CE655 course at CSM, and with a list of courses that may be of interest to him. I said I would also investigate the possibility of developing a course for him directly. Perhaps George Radosovich may have something of interest to him, and which is locally pertinent.

JDN:jd

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Khajonsak Hannarong, VP, Personnel Dept
Chermchan Ratanakam (Asst to Khajornsak)
Company: TelecomASIA
Telephone Number: 245-5000, 245-4035, 245-3571,
D.L. 248-6742, FAX: 248-6866
Date of Contact: 8 December 1992

Report:

I was originally scheduled to meet with Bob Gallagher. (See contact report for Peter Spinney, 9 Dec.). Bob had a case of food poisoning and was taken to the hospital. He therefore, didn't meet but it is apparent that he is a key person. I will set up a meeting with him before I leave.

I described NTU to Khajonsak, and he was interested. He discussed it in Thai with Chermchan, and she indicated that she thought it was a good idea.

Khajornsak had to leave and I talked a little with Chermchan. She showed me the training plan that Bob Gallagher has put together. She made a copy of the Proposed Curriculum Managerial Training Profiles and gave it to me. It is a little difficult to interpret, but the main item to be gained from it is that they are planning a well organized, well structured training program for their employees. I suspect they will rely heavily on the NYNEX curriculum from the Marlboro training center, since Bob Gallagher used to be the director of that. Nevertheless, we should have something to offer them.

JDN:jd

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Robert Gallagher, Director - Training Ctr.
Company: TelecomASIA
Telephone Number: 245-5000 x1106
Date of Contact: 11 December 1992

Report:

I met with Bob in the conference room of the NYNEX offices since he was going to be there for a meeting previous to that.

We had a general discussion before we got into details. He informed me that Chermchan, who was also present when I met with Khajonsak, previously was the Deputy Director for NIDA, (Nat'l. Industrial Development Authority ?, a group responsible for Human Resources Development in Thailand ?).

TelecomASIA has about 500 employees at the present time. They expect to have about 3 or 4 times that at this time next year. The only source of people who are trained in the area of telecommunications is from TOT, and the agreement that was reached that established them as the private telephone company, clearly defines the only people that they can hire away from TOT. They have hired some of those but not a lot, and certainly not all that they are allowed to.

Most of their employees are entry level engineers straight out of their BS degrees. They have the philosophy that if you are hired as an engineer you should have an engineering degree. There is no chance to become an engineer by coming up through the ranks from the vocational technician ranks. These engineers do not have any training in telecommunications. TelecomASIA will have to train all of them.

In view of the fact that they do not have any training capabilities in Thailand, they will buy almost all of their training for the next two years, at least. I suspect that a lot, if not most, of that will come from the NYNEX learning center. Other sources are the AT&T training courses and courses from Siemens and others. They have been discussing satellite linkages with AT&T, but that appears to be very expensive. I wasn't able to fine out more about what AT&T offers through satellite, but Bob said to contact Frank Zabinski (See CR with Mike Klipp, AT&T). Other sources of training will be from AIT (their new telecommunications program), King Mongkut Institute of Technology Ladkrabang (KMITL), and KMITT (Thonburi). They will be using the TOT training center, but that is mainly for the vocational level.

I showed him a copy of NTUplink, and our class schedule. His first reaction was that the courses in there were way over the head of the engineers they need to train. For example, he would like to have a 1 hour video that describes the telecommunications industry on a very basic level. This would be used to acquaint their employees at all levels just what happens when someone picks up the phone until the call is finished. How does the dial tone come on, etc. If we could produce something like that in the next thirty days he will buy it. Although that is not what NTU is all about it may be worthwhile to do something like that if we can, just to demonstrate that we can be responsive, and can offer a viable product. If we can do that we should respond with a cost figure right away. They would want the rights to translate it into Thai.

We discussed the offering of courses in English. He agrees that it would not be a good idea to translate technical courses into Thai. We would not know if the translator was translating correctly and we would lose control over the material and the quality.

In the next year to 18 months he expects that they will have a much more sophisticated, and higher level engineer to train. At that time our material may not be over their heads.

One area in which he is very interested is in the area of quality processes. He mentioned the Crosby Quality programs. We discussed TQM and some of the quality control courses that are parts of some of the NTU programs.

He mentioned that many US companies are forming consortia in Thailand in order to promote US goods and products. That will probably be a good entry point for NTU to market training such as the ATMP for US companies.

We discussed the Marlboro Learning Center that NYNEX supports in Mass. That one (on Locke Drive) is the flagship of all NYNEX centers. It has 224 dormitory rooms, a 500 person cafeteria, and auditorium that seats 175, 20 break out rooms, offices for 200 staff and trainers.

They have another training center in Marlboro on Forest St. That has 50,000 sq. ft. and serves mainly the Vocational Ed. level. They also have about 5 centers in Boston and 8 or 9 in New York.

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He said that it would be very important for us to visit the Marlboro training center, to become acquainted with what they offer. Contacts he gave me are:

Jan Keaney, (508) 460-4504, She is located at Marlboro, and is responsible for selling NYNEX training outside of NYNEX. She would set up meetings for us with training people.

Charly Bent, He does R&D planning for training. He is a former priest with a PhD in Theology, and a PhD in Adult Education. He is knowledgeable in interactive video. We should tell Jan that we want to meet with Charly.

We discussed more specific questions about the format, etc. He wanted to know if there is additional broadcast time available. I told him that I didn't think that was a problem.

I asked him specifically if TelecomASIA would be interested in using NTU courses. He said that he has the budget to do some things that could include NTU. What it comes down to is that if we have something that is of value to them, they will buy it from us. They might put some money into a pilot project but they would want to get something useful out of it.

JDN:jd

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NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Eric M. Glasscott
Company: Trend Star Communications, Inc.
Trend Star (Thailand) Limited
Telephone Number: (404)395-5111 (US) or (800) 743-0112
318-1516/8 (Thailand)
319-1828 FAX
Date of Contact: 1 December 1992

Report:

Eric is a consultant in the telecommunications industry. He has recently put together a consulting company in this area in Thailand which is 51% owned by Thais. Eric is based in Atlanta. Whereas he would not be a direct user of NTU services, he is very knowledgeable about the Thai industry. He is enthusiastic about NTU and is a very nice individual. He is a good friend and a strong ally.

On his way over here this time he stopped off at Hawaii to attend a conference of the US-Japan Leadership Council. He attended a meeting of the Working Group on Satellite Communications. Also at the meeting was a man by the name of Joe Pelton from CU Boulder. Eric suggested that we should contact him. He said there also was someone from CSU there, but he didn't have his name. I can try to find that out when I get back. They were talking about using satellite remote sensing as early warning systems for natural disasters such as tsunamis and others.

Eric said that the group setting up TT&T (Thailand Tel & Tel) is owned approximately as follows. (TT&T is the company that will install 1,000,000 lines in rural Thailand).

Loxley - 32%
Italthai - 16%
Jasmin - 32%
NT&T - 20%

NT&T is a Japanese company. However, they have had no previous experience in international telecommunications. I heard from several people that they don't think this is a good idea, but NT&T apparently came in with the best deal.

The ownership and organization of TT&T is very similar to that of TelecomASIA with NT&T essentially playing the same role as NYNEX with similar percentage of ownership.

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I asked Eric how many students there would be for a course. He said that for the advanced level courses maybe 0 to 3. For more basic courses there could be 150. He talked about courses being needed in the area of software engineering, fiber optics, digital signal processing, and areas such as that.

He did a study for NESDB. He said that Chapter 7 of that report on Human Resource Development was pertinent. He gave me a copy of that.

He recommended that we touch base with the Asia Pacific Telecommunity (APT). The ITU (International Telecommunications Union) is a part of the UN. There are several ITU's around and they set the standards for telecommunication. The APT is a regional ITU which sets standards for Asia. Chau Thongmat is the contact. His office is near the airport.

The Communications Authority of Thailand (CAT) has a monopoly on uplinks. They would need to be involved in any teleconferencing that would be done. The contact there is Tarworn Yaowakun, tel. 573-5405. We need to check with them to see what controls there would be on us.

We would also need to have a license from the Post and Telegraph Department. They have a complex licensing system. Eric thought we would only need that for uplinks and not for downlinks. The contact at the Post and Telegraph Dept. is Kittiyupho, Deputy Director General, Post & Telegraph Dept., 271-3509.

Eric thought that there would be a big demand for the type of training that NTU has to offer. He noted that there is even a bigger demand for vocational level of training but the demand for training at the level that NTU can offer will also be there.

JDN:jd

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NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: John Woodard
Company: University Linkage Projects
Telephone Number: 215-8251 (Phone & FAX & Home)
Date of Contact: 7 December 1992

Report:

John is a consultant that works with helping US universities to link up with Thai counterparts. He may be a good resource person to utilize in some phases of the project. He said he was glad to talk with me over lunch but made it clear that if we wanted to rely on him for more than that, he is a consultant. He was nice about it and I respect his situation.

He said that we need to talk with Thamoon Julmanichoti, of the Communications Authority of Thailand (573-5447).

He didn't think that Larry Hepinstall will ever get a license for Univ. Maryland.

We discussed what we are trying to do. He shared some insights that were very realistic and helpful. He said, for example that entities such as the faculty at Chula will be very interested in what we are doing and will express a great deal of support as long as it does not involve a commitment of funds from them. They will have nothing to lose, and obviously don't want to close any doors.

He wasn't very encouraging that the average Thai student would benefit from this approach, nor did he think they would do well with it unless they had strong tutoring at this end.

He implied that we would meet more resistance from the government sector if we tried to grant credit for courses. (This means that we would probably be better off to do this through someone such as AIT who has a Royal Charter to offer degrees in Thailand.)

He said we should contact the American Chamber of Commerce. He said the director is not a big supporter of academic institutions, but that someone below him would be a good contact. He had forgotten his name. (If we want to get a good contact there, I believe that Doyle Stout would be the person to help us.)

Some other names that he gave me are as follows:

Siam Motor Group; Khun Nittiya, also Tanin Chiewhawan is director of personnel. This is a group of auto manufacturers who intend to develop continuing education. They are a possible future contact, but not for right now.

UNOCAL; Greydon Lambaugh (American), President; Tel. 541-1970

Assumption Business Administration; Private premiere business school in Thailand. President is Dr. P. Martin Komolmas, (Brother Martin). Tel. 314-1446; FAX: 318-0125. They are located in Huamark, Bangkok Thailand.

Petroleum Authority of Thailand; Executive Director is Khunying Tongtip Ratanarat; 18th Floor, 555 Vibhavadirangsit Rd.; Tel. 537-3592/5; FAX: 537-3591

I believe these could be important future contacts.

In general, John was supportive but gave good advice not to be too influenced by supporters such as Chula, etc. who are supportive just to "hedge their bets". He agreed that we would need industry support. He was realistic but not discouraging.

JDN:jd

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Larry Hepinstall
Company: University of Maryland
Telephone Number:
Date of Contact: 30 November, 1992

Report:

We met at the hotel since he is moving his office. They had originally leased half of the campus of the old International School of Bangkok on Soi 15, Sukumvit. They found out later that they must own land where they are offering courses. They therefore, got out of the lease and now will have a campus at Cha-Am, a resort area on the west side of the Gulf of Siam, about a three hour drive from Bangkok. It is a great place to be, but it is really out of the mainstream. Only a residential campus would be feasible there.

He has been working for two years and previous to that someone was here for one year. The Univ. MD therefore has had someone working on this for three years, and they still don't have a license to operate as a university. One problem that they have, and which Larry implied and I agree, is that they don't have someone with the ability to get the paperwork through.

Larry is hopeful of getting a license in January. I am not sure he is realistic about that.

NTU would not have the same hurdles as UMD has. However, their experience points out the desirability of having partners with the ability to navigate around local obstacles.

UMD will be offering curricula in Business, Management, Hotel Management, etc. I discussed the offering of Hotel Management through NTU, and he expressed the opinion that hotel management is at the peak and can be expected to flatten out in terms of demand. I am not sure he is correct. There is a lot of building going on. (After visiting Hua Hin for a weekend, I think he is not really correct. There are multistory hotels going up all along the coast, both north and south of Hua Hin. I have heard that Phuket is well built up, and the other coast is developed all the way down to Rayong.)

JDN:jd

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Gloria Berebena, Asst. Information Officer
Company: U.S. Information Service, US Embassy
Telephone Number: 286-0900/9 X297 FAX: 287-2102
Date of Contact: 14, December 1992

Report:

Gloria said that they have agreed to provide the satellite time to host a video-conference for NTU between the US and Thailand. (I assumed this is Worldnet). What is needed now is to check their schedule and then get something scheduled. She said that they like to have about 1 month lead time. I said that I would check with Lionel Baldwin as soon as I get back, but that there really wouldn't be much chance of deciding on a date until after the first of the year.

The format that they can do is to televise the panel from Washington DC and then have the panel on this end ask questions. They can not televise the panel in Thailand. A question is whether we can have the panel in the US go to Washington to do the program. They can televise from somewhere else, but NTU would need to bear the cost of the hook-up to Washington. She said that it is the easiest if we can have our panelists do it from Washington.

She wanted to know if there was a conference scheduled somewhere with which we would want to tie this. I said that I would check with Lionel and Peter Deinken.

The time schedule was discussed. What works best is if we do it at 8:00-9:00am Bangkok time. This is 8:00-9:00 pm Washington time. To do it at 8:00-9:00 pm Bangkok time is another possibility but that is really not a good idea. We would run the risk of having a major traffic jam that could keep a major part of our audience, as well as some of the panelists, away.

One scenario which I favor is to have the broadcast from 8:00 to 9:00 in Bangkok, followed by a reception serving coffee, tea and breakfast (sweets and fruit). This would give time for the panelists, NTU representatives, the audience, and the press to interact and discuss the program. Also, we could have TV's around the area showing demo programs.

We discussed the location. We could do it at USIS. They have a small auditorium, and we could have the reception over in the swimming pool area. I think that is a good location. We could also do it at a hotel. That would involve a \$400 microwave hookup charge that NTU would need to pay. Also we would

need the hotel to have 3 direct telephone lines in the room. That would allow for a larger audience, and fancier surroundings. However, there could be a fairly substantial increase in cost associated with the room, telephone lines, hookup, etc.

For the format of the discussion we discussed NTU showing some example courses, doing a demo where students can interrupt a lecture live to ask a question, etc. I also suggested that the press could interview the US panel from BKK. This could be done also as part of a question and answer period at the end.

Suggestions for the BKK panel include Tongchat, the Minister (or Permanent Secretary) of University Affairs, Yongyuth, or others. (Maybe Tom Reese or Peter Deinken) Also high level people of US companies having a presence in Thailand. (NYNEX, AT&T, IBM, etc.). On the US panel could we get the Thai Ambassador? (Also Lionel Baldwin).

With regard to timing we could maybe do this as part of the kickoff of the first pilot project course.

We need to respond with the date, audience, etc.

JDN:jd

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Doyle Stout, NYNEX
Peter Spinney, NYNEX
Eric Glasscott, TrendStar
Eugene Morris, Jr., USAID
Peter H. Deinken, USAID
John D. Nelson, NTU

Company:

Telephone Number:

Date of Contact: 8 December 1992

Report:

I hosted a lunch meeting to discuss among many of the potential users of the NTU program, where we should be going and what we should do. Robert Gallagher, was unable to attend because he was sick. Steve Tsitouris and Michael Klipp declined.

We had a good discussion. It is clear that NYNEX is very supportive of the NTU project and would like to see it come into being. They all felt there would be a very large demand for the courses. The question of cost is one that pretty much excludes the general Thai student and all recognized that the industry must support it.

Gene Morris expressed that whereas USAID can fund certain aspects of the start-up, they are looking to the industry to help support the project. We will need a commitment from some source to pay for this at least long enough to get it started. The question came up as to whether the home HQ of some of the companies that already subscribe to NTU courses in the US would be willing to form the base of the clientele here through their international operations. (I had the thought that we may form a Thailand Board of Advisors or something such as that so that the industry becomes a stakeholder in the venture.)

We talked about a phased approach to a start-up. Gene Morris questioned why we need to do a demonstration. He suggested that we should go directly to a pilot project. This would have some cost savings, but the purpose of a demonstration would be to entice more of the industry to join in with the pilot project.

The first phase of the pilot project should be to utilize tapes, and therefore, avoid the problems with downlink licenses, etc. The use of tutors would be important to help in comprehension and avoid a sterile environment. In any event it is important to conduct some form of program to demonstrate that this works and is an important resource to the industry or whoever the support base is.

The question came up as to whether Thailand in general can be a site licensee, and then tapes could be distributed to a wide clientele and lower the cost per student. Also, if we broadcast into Thailand can we have proprietary channels? (I think that is not a problem if we have a broadcast band on the satellite, because the broadcast is coded anyway.)

It was suggested that we should consider making up a questionnaire to send to companies that have engineers and ask them a series of questions to assess their interest. (I personally, don't think that will work because the questionnaire won't necessarily reach the appropriate person, it doesn't have the ability to explain what NTU is offering, and I don't think we would get a very good response rate.)

It was mentioned that the upcountry market may be actually larger than in Bangkok. Other contacts also said this.

A lot of discussion centered around the level of training that is needed here. There is actually a larger need for the vocational level than the advanced level that we offer. I noted that although that may be the case, NTU doesn't have programs in that area. If this medium can be used to offer the vocational education there would need to be some type of partner that could offer the vocational training. However, it was noted that there is a large demand for the upper level of training also.

The issue then came up as to whether we could offer courses from the NYNEX learning center in Marlboro, Mass. through NTU. In that way the specific telecommunications training that they want would be presented. That is something that needs to be explored. US Telecom Training Institute (USTTI) offers courses in telecommunications in the US. They are based in Washington, DC.

The CP company will be launching a satellite through the PROC. It was suggested that we maybe should look into whether a channel would be available to us on that. (CP is the primary owner of TelecomASIA)

Dr. Prisart, Minister of Science, Technology and the Environment, wants an IT plan for Thailand. This agrees with the heavy emphasis that Dr. Yongyudh, placed on IT. There may be good market for programs in computer science and software engineering. That is another market sector that needs to be explored.

This particular group of individuals is very enthusiastic about NTU. I think it is clear that they will form the core support base.

JDN:jd

NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Yongyuth Yuthavong, NSTDA
Pairash Thajchayapong, Director NECTEC, &
Rector, King Mongkut Inst. Tech. Ladkrabang
Naksitte Coovattanachai, NSTDA
Sudhiporn Patumtaewapibal, Tech. Inf.
Access Ctr. (of NSTDA)
Sithichai Egoramaiphol, VP Administration,
Shinawatra Computer & Comm Grp
Kobsak Chantalikit, Mgr. Project Devel.
Shinawatra Satellite Co., Ltd
Sudharma Yoonaidharma, Asst. Dir. Acad. Aff
Faculty of Law, Chulalongkorn Univ.

Company: Seminar put on by NSTDA
Telephone Number:
Date of Contact: 15 December 1992

Report:

Prof. Yongyuth arranged a seminar attended by about 15 to 20 individuals from various sectors of the IT community. The ones listed above are those with whom I spoke before and after the seminar. I basically presented the concept of what we wanted to do in Thailand. I handed out copies of the NTU HIGHLIGHTS, the Executive Summary, and the list of courses in the Spring Catalog.

There was not a lot of discussion. Sudhiporn stood up and said that he had contacted NTU and had visited there about 2 years ago. He did not get a good reception, and said that much concern had been raised about the copyright protection in Thailand. I explained what NTU's concerns probably had been and said that we wanted to try to work out something that would be workable. He is in charge of an arm of NSTDA that had been fully funded by USAID until the coup occurred and AID funding to Thailand had stopped. He is responsible to provide information on technology and science to the general public. What he wanted to do is have some tapes available that he could show to people. If we get a pilot project going his office could serve to help publicize the program and provide information on how to gain access to programs. Perhaps he could have a demo that he could show or something like that.

Dr. Sithichai and Mr. Kobsak came up to talk afterwards. They will be launching a satellite with a Ku band over Thailand and a C band over most of Indochina. The launch will be in early December, 1993. They are very interested in talking with us and probably selling satellite time. They are very nice people and

would be helpful. In any event they may have the monopoly on satellites in Thailand. They were talking about being able to sell everyone a 70cm (?) dish that would let them access cable TV. The cost would be about \$700. They seemed to think that with this people could tune in directly to NTU courses. They said they could control who could have access by some form of registration similar to "pay for view".

I also talked with several people whose cards I did not get. Dr. Pairash was in that group. I was asking them what kind of courses they would be interested in. Dr. Pairash looked through the entire NTUplink catalog, and when he was done he handed it back to me and said, "all of them are of interest". He seemed quite enthusiastic about NTU.

We discussed briefly the copyright issues with Dr. Sudharma. He didn't have a lot to add about what we had already discussed, but he noted that he is doing some work on those issues related to software.

JDN:jd

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NTU/BKK FEASIBILITY STUDY
CONTACT REPORT

Name of Contact: Subin Pinkayan, President of SEATEC
Za-Chieh Moh, President of Moh & Assoc.
Company:
Telephone Number:
Date of Contact: 16 December 1992

Report:

Za-Chieh was in town from Taipei. He was formerly at AIT and now is President of the largest private consulting firm in Asia (or SEA?). Subin is former Minister of Foreign Affairs, former Member of Parliament, etc. He was at AIT with me also. Both of these men know their way around the business community in SEA and we are close friends. We can talk very frankly with each other.

I didn't discuss any specific contacts that I had made but we discussed the general concept of NTU, how it would work, the pro's and con's of bringing in tapes by satellite, the potential market, offering courses at the workplace, etc. This conversation brought to me the idea that we should perhaps form an advisory committee. This would be some form of a board of directors or advisors for NTU/SEA. This should include a limited number of well respected people from Southeast Asia, who we can trust, and in whom we have a lot of faith. This board could give good advice on matters such as the advisability of forming a partnership with Loxley/CAT vs. Shinawatra, potential clients, and they would establish our credibility in Thailand/SEA.

Subin gave me a ride back to my hotel, and in the car I discussed some of the conversations that I had earlier with Tom Reese in which he had indicated some concern about the reputation of AIT and how it is accepted within the community. I asked specifically about how AIT was accepted within 1) government, 2) universities, and 3) industry. He said that the government is very supportive of AIT, the Thai academic university community is quite neutral since AIT doesn't compete with them and serves a more regional group of students, and the industry is very supportive of them.

JDN:jd