A MANAGEMENT MANUAL FOR PUBLIC SERVICE SATELLITE PROJECTS

FOR: DEPARTMENT OF COMMUNICATIONS
under Supply and Services Canada
Contract: 05GR.36100-1-0203

BY: Lyndsay Green
November 30, 1981

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GLOSSARY OF TERMS AND ABBREVIATIONS*

ANIK-B	Satellite owned by Telesat Canada of which the 14/12 GH_z bandwidth portion was leased to the Canadian Federal Department of Communications for experimental purposes. The Anik-B Program began in 1979 and continues today.
ATS-6	United States National Aeronautics and Space Administration (NASA) Applied Technology Six multi-purpose satellite used for experiments in Alaska, Appalachia, the Rocky Mountain States and India from 1974 to 1976.
Bandwidth	The maximum frequency (spectrum) measured in Hertz or cycles per second, between the two limiting frequencies of a channel.
Broadband Communication	Communications using transmission facilities of sufficient bandwidth for video and other non-voice signals. (Usually defined as greater than 20 KH_z.)
CRTC	Canadian Radio-television and Telecommunications Commission. The Canadian federal communications regulatory agency.
DINA	The Canadian federal Department of Indian and Northern Affairs.
Dish	A parabolic antenna that is a primary element of a satellite ground station.
DOC	The Canadian federal Department of Communications.

* The source for many of the above definitions is "Development Communication Report", September 1981, No. 35, a publication of the Clearinghouse on Development Communication, Washington, D.C.

ACKNOWLEDGEMENTS

I wish to thank the interviewees who gave generously of their time in order to improve this manual. Their names are listed in Appendix C. A special thank you to Stuart Green and Hank Intven who contributed valuable advice and support. Appreciation is expressed to the Department of Communications who recognized the requirement for this manual and especially to Mike Helm for his co-operation. This manual was typed with exceptional skill and speed by Lynn Guindon.

The manual is dedicated to the superb staff of the Inukshuk Project.

Facsimile (telecopier) Transmission	The electronic transmission of pictures, charts, graphs, etc. from one place to another by radio, telegraphy, or telephone.
Footprint	That part of the earth's surface where a particular satellite's signal can be picked up.
Ground station (earth terminal)	Equipment on the ground used to send and/or receive satellite communications.
Hermes (The Communications Technology Satellite)	Satellite program sponsored jointly by DOC and the United States National Aeronautics and Space Administration (NASA) to develop high-power communication satellite technology in the 12-14 GH_z band, and to conduct experiments that explored the social, cultural, and economic impact of the introduction of new communication services in this band. The program ran from 1976-1978.
IITV Project (Interactive Instructional Television Project)	Tele-education Project using ANIK-B carried out by the British Columbia Institute of Technology and the Department of Distance Education to provide a two-way educational communications network to ten centres in British Columbia and one in the Yukon.
Interactive Media	A two-way telecommunications system that permits viewer response or participation. Interactive allows direct exchanges among people via one or more communication channels.
Inuit	Aboriginal inhabitants of the Arctic. The name means 'the people' in Inuktitut, the language of the Inuit. Sometimes know as Eskimos, an Indian word meaning 'eaters of raw meat'.
Ironstar Project	Native broadcasting project using Hermes carried out by the Alberta Native Communications Society delivering television programming to three native communities.

ITC Project (Inuit Tapirisat of Canada Project)	Teleconferencing, tele-education and broadcasting project using Anik-B, carried out by the Inuit brotherhood of Canada in three Arctic regions. Also known as the Inukshuk Project.
Memorial University Project	Telemedicine project using Hermes conducted by Memorial University of Newfoundland providing continuing medical education, community health education, consultation services and transmission of medical data; etc.
Moose Factory Telemedicine Experiment	Telemedicine experiment using Hermes between a remote nursing station a base hospital and a health science centre at the University of Western Ontario providing patient consultations, reading of X-rays, physiotherapy, etc.
Naalakvik II	Teleconferencing and broadcasting project using Anik-B carried out by Tagramuit Nipingat Inc. (the Northern Quebec Inuit communications society) in the Inuit communities of Northern Quebec.
Narrowband Communication	Communication system capable of carrying only a few voice channels or relatively slow-speed computer signals.
Quebec Telehealth Project	Telemedicine project using Anik-B between hospitals in Montreal and a remote work site in Northern Quebec providing teleradiology, teleconsultation and tele-education (medical).
Slow-Scan Television	A technique of placing video signals on a narrowband circuit, such as a telephone line, which results in a picture changing every few seconds.
Software	Any written materials or script, including films, videotapes, etc., for use in a communications system, or the program produced from the script.

STEP (Satellite Tele-education Program in British Columbia)	Tele-education project using Hermes carried out by the Distance Education Planning Group of the provincial government of British Columbia delivering educational programming to six sites throughout the province.
Telecommunications	The use of electromagnetic signals transmitted through wire, radio, optical or other means to convey signals, sounds, images or other intelligence.
Teleconference	A meeting where participants in different locations are linked by a telecommunications system. Can be audio teleconference (voice only) or video teleconference (where participants see one another via TV).
Tele-education	The use of communications technology for educational purposes.
Telehealth (Telemedicine)	The use of communications technology in a variety of health care settings and applications.
Telehealth Team	Team of telehealth specialists based at the Canadian federal Department of National Health and Welfare. The mailing address is listed in Appendix B "Information Sources".
TV Ontario Project	Tele-education project using Anik-B carried out by the Ontario Educational Communications Authority delivering interactive television courses to remote communities in Ontario.
University of Québec Project	Series of twelve tele-education projects using Hermes conducted by the University of Québec linking 14 points across Québec. Also known as the Omnibus Network.
Uplink	The transmission from an earth station to a satellite.

INTRODUCTION

1. Public Service Satellite Projects

For over a decade public service organizations have been exploring the capability of satellites to meet their service delivery and communications needs. In Canada this process has been sponsored by the federal Department of Communications through two major satellite programs, Hermes and Anik-B. Of some seventy experiments and demonstrations that were carried out on Hermes between 1976 and April 1979 approximately half were public service applications. The Anik-B Program, which began in 1979, initially included fifteen pilot projects of which five were technological and the balance were social, administrative or broadcasting in nature. Plans are underway to extend the Anik-B Program to 1983 and to provide additional oportunities for pilot projects.

A wealth of information and experience has been gained from these projects regarding the potential of satellite technology to meet public service needs. Satellite projects have brought college courses to students in remote communities, allowed nurses in isolated locations to confirm their diagnosis with specialists in urban centres and developed broadcasting in native languages; to give but a few of the many examples. Projects have shown that satellites have the capability to deliver a wide range of social services and, if the circumstances are right, to do so in a cost-effective manner. At the same time users have discovered that public service satellite projects are time consuming, resource intensive and require highly-developed organizational skills. Users have found that the successful project is characterized by careful planning, extensive co-ordination and strong lines of administrative communications. (10, p. 71)*

In both the Hermes and Anik-B Programs the sponsoring organization was required to carry out an evaluation of the experiment or pilot project. As a result, volumes have been written on whether projects attained their goals, whether the technology served its purpose, whether needs were met and whether satellites are a cost-effective way of

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* Numbered citations in parentheses refer to bibliography document number and page.

achieving these results. Very little, however has been written about how the project was planned, implemented and managed. As a result, every new user of satellites must start from scratch and is unable to benefit from the management experience of those who went before him. This manual attempts to fill that gap.

2. The Manual

This manual synthesizes the knowledge gained from the managers of present and past public service satellite projects in order that their experience may be passed on to new users of satellites. It is a practical handbook designed for use in the day-to-day management of public service satellite projects. The manual is also intended to be useful to policy-makers and satellite service providers as a practical assessment of satellite facilities from the management perspective of the user.

The manual draws heavily on the experience of the author who was Operations Manager of the three year Anik-B Project sponsored by Inuit Tapirisat of Canada (ITC). The findings from the ITC Project have been expanded upon through input from other public service satellite projects as gathered from written reports and personal interviews. As a result, the manual incorporates a range of experiences and is of relevance to a broad cross-section of public service users.

In order to fully appreciate the scope of undertaking a satellite project it is recommended that the new user of satellites begin by reading the manual in its entirety from front to back. Each section, however, is intended to stand on its own and is sometimes cross-referenced to other sections in the manual which amplify the topic. The Table of Contents provides a reference guide to the manual's contents. In addition, a Project Checklist has been provided which summarizes the essential elements in the development, implementation and operation of a satellite project. After the manual has been read the Checklist can be used alone as a convenient management summary and organizational tool.

3. The Methodology

The manual was researched and written over a three month period with the co-operation of many individuals. The author wrote a first draft of the document which reflected her personal experience, amplified by the written research findings of other projects. The draft was circulated to a number of knowledgeable people including several, recommended by the Department of Communications, who had managed public service satellite projects. In total sixteen people, whose names are listed in Appendix C, commented on the draft. In most cases the interviewees provided detailed comments on a page by page basis. The input of the interviewees was incorporated into the final draft and specific quotations appear in the text by name and number corresponding to the alphabetical listing in Appendix C. This contribution has both enriched the manual and expanded its applicability to a wide range of public service users. It is only fair to the interviewees to state, however, that the decision to include or exclude items and the duty of interpretation rests fully with the author and it can not, of course, be assumed that the interviewees agree with everything that is in the manual.

One additional feature to this manual should be noted. From time to time, particular statements appear in darker type. This emphasis has been added by Terry Kerr, the manager of the Hermes and Anik-B Programs whose experience observing all the experiments and projects has led him to appreciate the crucial aspects of project management. (Kerr #6) His recommendations are highlighted to alert the new user to their high priority.

4. <u>The Inuit Tapirisat of Canada Project</u>

The Inuit Tapirisat of Canada (ITC) Project provides an interesting illustration of the potential complexities of satellite projects because it dealt with vast distances, extremes of climate and topographical, cultural and linguistic differences. The project had a decentralized administration with the Project Director and staff divided among six remote communities in three Arctic regions. There was a small additional staff in a southern urban centre. The staff had little or no technical background and required extensive on-the-job training. The technology was subjected to extreme cold, wind, dust and snow conditions. Facilities to house the equipment were often rudimentary. The demands on the project were complex requiring the provision of technical capacity for teleconferencing, tele-education and broadcasting via satellite. The programming was produced in and transmitted to six communities in three Arctic regions, each region having its own linguistic dialect. In addition, the project operated a pan-Arctic video distribution system. Further details of the ITC Project are to be found in the ITC Pilot Project Plan which is attached as Appendix A.

Examples from the ITC Project that illustrate points in this manual should be considered in the above context. Each project will have its own goals, its own needs to meet and its own particular operating environment. All examples in the manual are to be used as just that, examples only, and immediate applicability to any other project should not be assumed.

5. The Limitations

It is important that the new user be aware of the limitations of this manual. It does not advocate the use of satellites or the undertaking of satellite projects. It restricts itself to recommending what the user should do once the decision has been made to carry out a satellite project. As previously stated, there are many benefits to be gained from the use of satellites but the efforts and costs required can be considerable. Any decision to undertake a satellite project must be very carefully weighed and it is hoped that this manual will assist in such deliberations by spelling out precisely what is entailed.

It also must be emphasized that, although this manual focuses exclusively on satellite projects, other telecommunications facilities might be able to do some jobs. Much of the manual will be equally applicable to any public service telecommunications project. Memorial University, for example, concluded that their satellite project could just as successfully have been carried out on terrestrial facilities. Satellite was not a prerequisite. "We carried out our activities via satellite because the system was offered at no cost. Had similar facilities been in place and freely available on terrestrial communications systems, we would have conducted exactly the same Project." (15, p. 47) For other projects a satellite system is the only alternative. The ITC Project had to be carried out on satellite because terrestrial facilities are not available in most of the Arctic.

The manual has limited itself to a focus on public service satellite projects. This restriction has been made because the requirement of such projects to provide a service to a public makes them unusually dependent on the co-operation and support of the end users or target audience. This dependency imposes a range of requirements for user participation programs, consultation and programming procedures that would not be necessary in most technological experiments or commercial undertakings. It is hoped that much of this manual will be applicable to satellite projects in general but the goal has been to address the specific, and often unique, concerns of the public service user.

PROJECT CHECKLIST

I PLANNING

A. PROJECT CONCEPTION

1. Establish a long lead time

Extensive lead time is required to prepare for satellite use. Experience from the Department of Communications (DOC) satellite program suggests that the average lead time requirement is eighteen months. (9, p. 36) The planning process must be thorough in order to minimize problems at the operational stage and this process is usually lengthy. Needs assessment and user consultation contribute to a successful project and are time-consuming. Programming must be developed and people need to be trained. Equipment delivery time is invariably longer than anticipated and the hardware must be installed and checked out. All these activities take time and slippage of deadlines is inevitable.

The specific amount of lead time required will be influenced by many factors including the objectives of the project, the number of participating organizations, the availability of equipment, trained staff, programming, etc. The Inuit Tapirisat of Canada (ITC) Project was designed with a two year lead time in order to allow for the training of video producers and an intensive community consultation program. The British Columbia Interactive Instructional Television Project (IITV) found that their lead time of seven months was adequate but resulted in a hectic pace. An additional four to five months of lead time would have been desirable. (Robertson #14) The Quebec Telehealth Project, that delivered medical services to a temporary work site, had a lead time of five months. The project co-ordinator felt that any additional lead time would not have been of assistance in this case because the work site construction advanced more rapidly than anticipated and advance planning proved to be difficult. (Pagé #12)

One rule of thumb that has been suggested, is that if one calculates a reasonable length of time for implementation it will likely take one third longer. (3, p. 3) But possibly the most valid guideline was provided by the TV Ontario Project co-ordinator. "It takes all the time available." (MacGregor #9)

2. Start with the needs

The Hermes evaluators recommend that projects "go for real needs and primary objectives". (11, p. 13) That is, the project should be designed to meet real needs that are linked to the primary objectives of the sponsoring organization.

In the case of the ITC Project, the general need to be met was a clearly articulated requirement for improved communications among Inuit communities. This need had been expressed in surveys, community petitions and resolutions of Inuit organizations. Other projects have been based on improving medical care in remote regions, extending adult education courses to rural areas or bringing educational television to underserved communities. Whatever the needs, care must be taken to ensure that they are genuine and a high priority of the group being served.

3. Make sure you have the mandate

Your organization must have the mandate to carry out the project. Without the proper mandate the first problem will likely be obtaining the necessary funding, but the subsequent problems of gaining co-operation and stamping out political fires will make the funding problems look simple. Telehealth evaluators have found that resistance is particularly high to projects where an institution attempts to expand its own market and influence at the expense of other organizations which are already providing a similar service. Successful projects rely on established mandates, designated responsibilities and attempts to improve existing patterns of communications rather than creating new ones. (Martin #10)

If you are working in an area of endeavour where no one actor has a clear mandate, one solution is to set up an advisory committee that meets several times a year to review the project's progress. This committee will provide the necessary mandate and give valuable advice but should not be confused with a managing body which is empowered to run the project. The IITV Project found that their advisory committee played an extremely valuable role in the project but only after its mandate had been carefully circumscribed. "The managing body is responsible to make the project run. The advisory committee simply gives management guidance, which it accepts or rejects at its peril." (Robertson #14) See Management, p. 29, for further discussion of this issue.

4. Make sure you have organizational backing

In-house public relations work will have to be done to insure that the sponsoring organization sees the project as a priority and that its full backing is assured. The job is not an easy one because you are usually arguing for the diversion of resources away from existing programs into the new and the experimental. It is particularly difficult in an organization where resources are already scarce.

It is not unknown for a small group within an organization to attempt to launch a project without ensuring organizational support in the hopes that the project's momentum will carry it. It can work, but usually not with projects that are resource intensive and have a high public profile.

5. Commit organization's resources

Evaluators have found that a factor in the success of a project is the degree to which the sponsoring organization committed its own resources. The project has a higher survival rate if it is well-integrated into the sponsoring organization and is not just a peripheral tack-on with no commitment from or tie to the broader organization. (11, p.2)

6. Look into sharing facilities

It is important at the planning stage to find out whether other organizations would be interested in co-sponsoring the project or sharing satellite facilities. Involvement of other organizations will create a broader base of satellite use and financial support, which will determine the commercial feasibility of on-going satellite use. It is unlikely that any one specialized use of the satellite will pay for itself so it is best to aim for a project that incorporates multi-use potential.

On the other hand, there are several cautionary notes to the sharing of satellite facilities.

(a) The degree of administrative complexity increases with the number of organizations involved and that increase occurs at an exponential rate. As the IITV Project found, "We started out with a very few organizations involved and it was manageable. We ended up towards the end with about ten to fifteen different organizations in the project and it almost reached the point of being unmanageable." (Robertson #14).

(b) If you are counting on the financial contributions of other organizations, make sure that they are assured of obtaining the necessary funding.

(c) Make sure that the other organizations have the necessary mandate to carry out their portion of the overall project.

(d) Consider the ability of the organizations to work together - their philosophies, ability to establish compatible rules of the road, willingness to compromise, etc. (Martin #10)

(e) Roles and responsibilities of all the parties will have to be clearly set out.

7. <u>Pull together a planning team</u>

Pull together an inter-disciplinary team to carry out the planning. The team should include individuals responsible for the following areas: programming content, program production, technical systems, evaluation and management (co-ordination). It is recommended that the team leader be an expert in the content area. For example, a telehealth project should be directed by a physician, a tele-education project by an educator, a native broadcasting project by a native broadcaster. Somebody with peer clout is required in this role to ensure the project's credibility with the participating organizations and the user community. (House #4).

To ensure continuity between planning and implementation the planning team should have a commitment to remain with the project for its duration. If the planning and implementation team are one and the same, it is more likely that the project design will be realistic and manageable. Members of the team must maintain continual communication during the very crucial planning stage.

8. Redefine needs as project goals and objectives

Redefine needs as very specific project goals and objectives. For example, ITC redefined the general need for improved communications among Inuit communities as nine project goals. Examples of these goals are, "Test the usefulness and cost of instruction and information exchange for adults by satellite", "Test the economic viability of an Inuit television broadcasting service", "Train Inuit in film and video production".

Don't be too ambitious when establishing project goals. There is a tendency to set unrealistic goals for projects which later have to be reduced or abandoned. Goals may also shift as a project develops. For example, telehealth evaluators have found that as the project begins to meet certain needs in the user population, demands may be put on the project to satisfy other needs which have taken on a new priority. (Martin #10)

Where possible, project goals should be ranked in order of priority to assist decision-making in the event of a conflict among goals. For example, mid-way through the project, the goal of training local people in program production may run into conflict with the goal of broadcasting a specified minimum amount of videotaped programming per week. If the priority is to ensure that local people are adequately trained then it might be necessary to reduce the amount of programming produced. Or, if program production is the priority, the decision might be taken to reduce the reliance on local people in order to keep production at the intended level.

9. Translate the project goals and objectives into technical requirements

The project goals and objectives must be further translated into very specific technical requirements. For example, if your objective is to research the effectiveness of teleconferencing for meetings among widespread organizations or to test the reliability of remote medical diagnosis, these objectives should be defined in terms of technical requirements. The planning team will have to consider whether full-time interactive video is required or whether reversible, press-to-see video is adequate, what number of audio channels will be required, etc. This process will be further discussed in the Systems Design section. (p. 66)

10. Examine available communications technologies

Once the project objectives have been translated into technical requirements the availability and costs of alternative signal distribution systems that might meet the needs should be examined. It is extremely important to cost out the various options, even if there is the option of donated satellite capacity, because a commercial system might be more cost-effective in the long run. For example, the commercial system will be available on a continuing basis and it may require less costly user attachments. In addition, it may be one which people are already accustomed to using and to maintaining. (10, p. 40)

If there is a chance that the project will become operational, it is essential to assess your technological needs in light of the communications facilities that will be available to you once the project is over. For example, if the project requires the purchase of satellite ground stations, will they be compatible with proposed future satellite systems?

11. Consider the transition from experimental to operational service

In planning the project it is important to assess whether a transition from the experimental stage to operational service may be desirable and if so, whether it is feasible. Project evaluators report that there is a danger in "concentrating on the extremes of what the technology can accomplish and paying too little attention to the costs of the ultimate operating version of the experiment". (16, p. 54)

On the other hand, you should not clip your wings unduly. The project may not seem commercially or operationally viable at the beginning of the experiment but developments in this volatile field may render it feasible by the end. Some possible developments are technological innovation, changes in the regulatory environment, new offerings by the service providers and increased opportunity for user sharing of facilities.

12. Identify and locate the resources

The required resources must be identified and located and care must be taken that they are not underestimated. The budget should be prepared hand-in-hand with a detailed management plan. Resource requirements, both financial and personnel, should be estimated for each task in each phase of the project. Hefty contingency allocations must be built into the budget to cover the unforeseen and to permit the necessary degree of project flexibility. In the case of the Hermes projects it was concluded that "the absence of previous experience with communications technology may have caused some experimenters to underestimate the resources required to carry-out their projects". (7, p. 19)

It is important to draw up a series of budgets reflecting various funding levels. The budgets should lay out fall-back positions that reduce the project scope relative to reduced financial commitment. Don't get caught in the position of having your funding halved and yet still be expected to meet the original project objectives. It is also important to establish a minimum budget below which nothing should be attempted.

Strive to minimize the number of different funding sources that are financing the project. Each funding organization will have its own expectations and will put its own demands on the project. This can interfere with project priorities if not kept under control. Many projects, however, have fund-raising difficulties and have no choice but to rely on a variety of funding sources.

Attempts should be made to get long-term funding assurances from the funding sources but, again, this is not an easy job. ITC was in the relatively unique position of receiving a commitment from the Department of Indian and Northern Affairs (DINA) for the full three years of required funding. Because of the specific nature of the Project ITC would not have proceeded without this commitment for fear of raising community expectations in the first year that would have had no realization if funding was cut. (See Financing, p. 25 for further discussion of this topic.)

13. Reinforce other programs

Examine ways in which the project can reinforce other on-going programs and activities because the greater the degree of integration into existing structures, the better the chances of the project's long-term success. For example, telehealth evaluators recommend that projects which offer specialist consultation should rely on existing medical referral patterns, i.e. if patients from a specific region are normally referred to Hospital A then the project should reinforce this practice. (Martin #10)

Steps should be taken to integrate the project into other organizational activities. Projects should seek accreditation of their programming by the appropriate professional organizations. ITC's Project made the satellite communications system available to dozens of northern organizations for use in their on-going work.

14. Develop a post-project plan

A post-project plan, outlining what will happen after the project terminates, must be drawn up during the planning stage. It is essential that the participating organizations have realistic expectations about the project's time-frame, including its potential for providing an operational service. Attention must be paid to minimizing the level of raised expectations among the user community. When field staff encourage user participation they must be able to clearly state the time limits of the project and any plans for follow-up. This is essential to establish good user and community relations and to maintain staff morale.

Some projects are demonstrations with a fixed time-frame and no potential for on-going service. Others are designed as pre-operational systems with the intention of sustaining project operations in some shape or form. With others, the decision as to whether to go operational or not is dependent on the results of the experimental project.

The Quebec Telehealth Project, for example, had no intention of providing a continuing service. Care was taken to ensure that participants understood that the service would terminate with the end of the satellite project. Participants were told that, although the particular service would not continue, the data gathered from the project would provide valuable information for the development of operational telehealth systems elsewhere. (Pagê #12)

If there is a possibility of the project transferring to an operational phase then the provision for future planning must be built into the project from the very beginning and specific responsibility for long-range planning must be assigned. Continual work must be done on questions such as user response, long-term production capability, availability and costs of alternate signal distribution systems and compatability of such systems with project goals and equipment. A strategy must be developed for dealing with the decision-makers who will determine the project's future. The strategy should identify the interests and influences of the various actors and devise techniques for influencing decision-making (i.e. briefs to government, interventions before regulatory bodies, demonstrations to other potential users, etc.).

15. Develop the evaluation plan

An evaluation plan must be developed at the beginning of the project and designed as an integral part of the project. The evaluation itself must begin at the earliest opportunity if baseline data is to be gathered to enable a before/after assessment to be carried out.

It is recommended that milestones in the evaluation be tied in with project planning. For example, ITC's evaluator completed audience surveys in time for a project meeting held to set program production goals for the next stage of the project. The survey information was crucial to planning because it reported audience reactions to program subject matter, format, length, etc. The evaluation meeting also resulted in a realistic assessment of the staff's program production capability. (Valaskakis #15)

16. Reinforce some traditional areas

The project should reinforce as many traditional areas of practice as possible in order that it not be rejected as too revolutionary or threatening. This recommendation is particularly relevant to telehealth which "may face considerable resistance if it appears to displace "bread and butter" needs (staff, basic training, reference books, etc)". (28, p. 25)

In addition, the project should reinforce, as much as possible, established communications patterns and relationships. The superimposition of new patterns onto traditional ones will often meet a great deal of resistance. (Martin #10)

17. Develop a detailed operational plan

During the planning process a detailed operational plan should be developed. The Pilot Project Plan format developed by the Department of Communications serves as a good model. It provides an excellent vehicle for a project summary and a means of ensuring that major aspects of the planning process have not been overlooked. For reference, a copy of the Pilot Project Plan submitted by ITC according to the DOC format is attached as Appendix A.

B. STAFFING

1. Dedicate full-time staff

Existing staff of the sponsoring organization will not be able to absorb the extra work of a satellite project on a part-time basis. There must be a core of staff who are assigned to the project on a full-time basis. In addition, some projects rely on part-time staff working at various levels of responsibility. Field staff, for example, may only be needed for the specific number of hours that the ground station is in operation but they should make a full term commitment for the length of the project. The team leader of the Memorial Project carried out his responsibilities on a part-time basis for the full term of the project. He found that part-time staff with other functions within an organization can sometimes facilitate the project. (House #4). Those who are given part-time assignments on the project must anticipate the likelihood that the satellite work will demand an unanticipated amount of time.

2. Aim for staff continuity

One of the selection criteria when hiring staff should be willingness to remain with the project for its duration. This is particularly true of the planning/implementation team. Evaluators have found that the successful project is characterized by a high continuity of staff, particularly in top management. (21, p. 15) The relatively short-term duration, high intensity and relative uniqueness of the project mean that people are difficult to replace and project momentum is lost in the process, sometimes irretrievably.

3. <u>Locate reliable technical advice</u>

The project must have access to reliable, creative and responsive technical advice. The technical advisor must be willing to design the technical system according to the human parameters of the project rather than allowing technical considerations to unduly limit the human dynamics of the system.

It is important that the technical advisor be hired by and responsible to the project. It is insufficient to rely on the technical advice provided by the satellite service providers or equipment suppliers. (House #4)

4. <u>Staff must be committed</u>

The project will not lend itself to a 9-5 working approach. As a result, staff must be committed to the project, be highly motivated and be willing and able to work flexible hours. Staff must be forewarned as to the working conditions and arrangements made for overtime pay, time off in lieu, etc. It will also not be easy to allow people to take off large amounts of time during the satellite phase because of the intensity of the operation.

5. <u>Staff must be willing to learn</u>

All staff, but in particular the field staff, must have a high degree of willingness to learn. Their skills may be called upon as survey takers, interviewers, on-air personalities and even pole climbers. They will have to adjust, patch and substitute equipment, often with nothing more than over-the-phone instruction. In general, all their training will be on the job and sometimes just 'learn by doing'.

6. Previous technical training is secondary

As long as the project has adequate support from qualified engineers and technicians then previous technical training for field staff is of secondary importance. Many of the necessary technical skills are best picked up on the job and the project should have a built-in training program to accommodate this.

None of the ITC community co-ordinators responsible for uplinking with the satellite, conducting operational tests or exchanging equipment had any previous technical training. The necessary step-by-step instruction was provided by the technical supervisor, engineering consultant or Department of Communications personnel as required. (24, p. 51) Similarly, in telehealth projects it is often the nurses in remote nursing stations who are required to change fuses, pull out boards in the back of equipment and do various other trouble-shooting chores. (12, p. 54) These positions do not need to be filled by people with previous technical training as long as they have the previously cited qualities of commitment and willingness to learn.

On the other hand, it is essential that the staff be familiar with the working environment and have relevant working experience. Experience with satellite or communications technology is of secondary importance compared with the need to be experienced in the project's area of endeavour, whether it be adult education, telehealth or native community work.

7. Hire locally

Hire staff locally and train them rather than importing trained staff, wherever possible. There are many good reasons for this:

(a) In general, it will enhance the project's community relations.

(b) The project will have better access to community resources.

(c) Staff turn-over will be lower.

(d) Staff will be able to speak the local language or dialect. This is particularly critical for the production crew who must be able to understand what is being said 'on camera' in order to produce a show.

(e) There can be high costs associated with importing staff; isolation pay, family resettlement costs, travel home, housing.

(f) There is also the cost of the adaptation period that imported staff have to go through. Sometimes they fail to adapt.

(g) If there is a possibility of the project becoming operational, then the development of local skills will leave a legacy of trained talent for the future. (Ward #16)

In conclusion, although training local staff can be expensive and time consuming it offers the greater short-term and long-term benefits both for the project and for the community.

8. Arrange for staff housing

If the project involves remote or isolated communities special attention must be paid to arranging suitable living accommodation for staff. Housing is usually at a premium in these communities and it may be necessary to bring in trailors, modify existing structures or build from scratch. Sometimes housing can be 'borrowed' temporarily from another organization to whom it has been allocated. Next to job satisfaction, suitable housing is often the single most important determinant of whether staff will remain with a project, in a remote community. (MacDonald #8).

9. Expand staff with secondments

The project will be more fully integrated into the community and, hence, have greater chance of success, if an effort is made to second people from supportive agencies. For example, the ITC Project seconded a technician from the Department of Communications for one year and borrowed a variety of resource people from other agencies for short training periods. Arrangements were made with a high school to provide class credits to the students who worked in the studio as cameramen. Some organizations, such as the adult education department allowed their staff to devote a major portion of their working day to the ITC Project. In order to provide people, such as these, with adequate support the project should make a high level agreement with the organization concerned. It is important to emphasize, however, that seconded staff should be used to supplement, not replace, the core of permanent staff.

C. PROJECT DEVELOPMENT

1. Build upon existing knowledge

Don't reinvent the wheel. A great deal has been learned about tele-conferencing, telehealth, tele-education and satellite broadcasting in the past decade. Make use of this knowledge at the project development stage. Attached as Appendix B is a list of organizations with expertise and research libraries related to satellite projects. Special note also should be made of the annotated bibliography Telehealth-Telemedicine published by the Canadian Medical Association which summarizes telemedicine projects in the United States and Canada and reviews the literature. It is listed in the bibliography. (25)

2. Establish relationship with participating organizations

Every project relies on other organizations for some degree of project participation and relationships should be established with these organizations at the earliest opportunity. Depending on the project, these organizations may be producing programming for the project, they may be providing on-air resource people, their staff may be the target audience, etc. It is important to obtain the support of the board of directors and administrators of the organizations in order to facilitate the participaton of organization personnel in the project. Memorial found that a successful working relationship with an organization was dependent on the day-to-day administrator being supportive of the project. (House #4)

3. Clearly define interests

It is essential that the various bodies involved in project development clearly define their objectives and interests at the outset of the project. The providers of satellite facilities, funding sources, participating organizations, etc. should make clear what they hope to get out of the project and any conflicts should be recognized, if not resolved, at an early stage.

4. Co-ordinate planning with users

Methods of co-ordination should be set up to give the main groups of participants a say in project development. Research has shown that there is considerable value in involving users in the planning process at an early stage. It helps in learning about the needs and problems of the user group and can help in winning suport for the innovation.

On the other hand, involvement of users should not mean turning over all decisions to them. "Often users make unrealistic demands, e.g. full colour video conferencing, where the cost and lighting requirements make it unfeasible." (3, p. 3)

5. Do a need assessment

At the project planning stage, it is essential to undertake an in-depth assessment of the needs of the users or the target population. Techniques used by projects vary from community surveys to meetings with representative bodies. One researcher recommends setting up a panel of experts and people affected by the potential problem area in order to identify the needs. (26, p. 37) ITC, for example, had been conducting research into Inuit communications needs for two years prior to the project design stage through a combination of interviews, community meetings, workshops, etc.

Projects have found that the needs assessment is not a simple, straight-forward task. People need to understand the nature of the project and the options open to them before they're able to make a useful contribution to the planning process. It is often only once the project has been in operation for some time that people begin to understand how the technology might meet their needs. There is an argument that innovation is a better way to reveal needs rather than to rely on explicitly stated desires. "To innovate is to sense real needs which the user is unable to express clearly. This is why innovations, like lighthouses, light the path of needs analysis whereas the expressed needs are only a rear-view mirror." (23, p. 33)

In summary, carry out a needs analysis but be prepared and hope for the illumination that innovation should bring.

6. Know the users/target audience

It is important to know the characteristics of the potential user groups or target audience and their operating environment. Baseline data relevant to the project should be gathered during the planning phase such as socio-economic data, linguistic breakdowns, political structures, institutional context, existing communications facilities and information networks, etc.

7. Establish methods for user support

Arrangements must be made to ensure that users have the full backing of their employers for their project-related activities. Will the employer allow project activities to take place on his time? If the user is required to put in overtime hours in order to participate in the project will the employer provide compensation? In one situation during the Moose Factory Telemedicine Project participants were being forced by the hospital administrator to finish up their regular work after hours. "This naturally discouraged some individuals from participating actively in telemedicine and there was no administrative arrangement between the two hospitals to stop the unfortunate practice." (4, p. 86)

A tele-education project conducted in Brazil failed to gain the support of the teachers primarily because the project required them to work in a new and much more demanding situation without extra pay. (18, p. 23) The Memorial University evaluator concluded however, that "material incentives such as time off, extra pay, and course credits are important, but insufficient, and possibly not even crucial. Professional motivation and a sense of being a participant in the project are more important." He concluded that users should be provided with as much support as possible during the actual broadcast period. (21, p. 195)

8. Prepare detailed management plan

The project should be broken down into its various phases and an itemization made of the tasks that should be accomplished in each phase with an estimation of budget and manpower requirements for each task. Schedules should be developed and target dates set related to key areas such as funding, equipment ordering, system installation, development of programming, etc. Some projects use timeline sheets showing start and end dates for all activities. The management plan should be modified and updated throughout the course of the project.

As an example, ITC broke its project down into the following chronological phases with tasks itemized under each phase:

(a) Planning, Training and Production
(b) Implementation (including Pre-test)
(c) Operations
(d) Wrap-Up

Time charts were drawn up which specified tasks to be accomplished on a weekly or monthly basis in each of nine categories of activity:

(a) Community Co-ordination
(b) Program Development
(c) Training
(d) Operations (DOC liaison, funding, licensing, etc.)
(e) Systems Design
(f) System Testing
(g) System Installation
(h) Videotape Distribution
(i) Evaluation

9. Make contingency plans

Make contingency plans to cover all aspects of the project. What are the plans if equipment is not delivered in time, if the co-sponsor pulls out, if programming commitments cannot be met, if funding is less than anticipated? Project managers say that Murphy was being optimistic when he set forth his law that 'Anything that can go wrong will go wrong'.

D. SOME EARLY DECISIONS

Very early on in the planning process a number of decisions will have to be made that will shape the project. Here are some of them:

1. Project length

In deciding on the length of the project there are several factors to consider. What are your resources? In this regard it is important to remember that the bulk of the costs are incurred in start-up and the on-going operating costs are much less significant. How long will it take to meet your objectives and learn what you want to know? It is important to remember that the novelty factor can effect your findings therefore the project has to be in operation long enough that people adjust to it. What kind of experimental results do you expect? Evaluation may require a significant sample for research purposes; (eg. number of users; number of hours of use, etc.). (Martin #10) A key questions is how long will the staff be able to sustain the level of output? To answer that question there must be a realistic assessment of the staff output required per programming hour, (which will vary according to format). If a goal of the project is training then the project length should be sufficient for trainees to get beyond the training stage and into the operational phase where their skills will be fully developed. (Ward #16)

2. Target audience/User groups

Selection of the target audience or user groups will be a determining factor in many of the subsequent decisions such as time of year, day, location of project room, etc. Beyond defining broadly the target audience or users, the various sub-groupings should be assigned a priority. This process will be important in the event of conflicts over general project orientation or over access to the system. For example, ITC drew up principles for access which set priorities in case of competing demands for scarce resources, e.g., "In general, topics that are of the most interest among all communities will have the highest priority". "Urgent issues affecting Inuit life will take priority over all other uses of the satellite."

When selecting the audience or users it is important to consider the requirement to serve different sub-groupings at different times. Certain segments of the community or certain professional groups may not participate fully unless they can be segregated for purposes of project participation. (Martin #10)

Projects have shifted emphasis from one target audience to another, in mid-project, in response to interest levels. While this is sometimes unavoidable it is preferable to design the project with the end user in mind. Planning decisions will have strong implications on the availability of the system to a particular group. The technical system, hours of transmission, software development, location of the transmission/reception rooms, to list a few examples, may act as an impediment to a new use of the system.

3. Number of locations

In assessing how many locations should be involved in the project several factors come into play.

(a) Availability of ground stations - The satellite facility provider may have a fixed number of ground stations available to the user.

(b) Funding - Additional communities can be added through the purchase of ground stations or by linking additional communities by terrestrial lines. With every community added project costs increase for additional hardware, maintenance costs, fieldwork and program development.

(c) Ease of operation - An assessment must be made as to the number of locations that it is practical to link together and still make for viable operations. The Hermes evaluators were unable to specify the exact point at which there are too many locations involved for effective interaction. They did estimate that the number of people that can satisfactorily participate in group interaction numbers in the tens rather than the hundreds. (23, p. 128) Even this guideline, however, is clearly context specific. Fewer people can be satisfactorily involved in a highly participatory discussion than can enjoy a lecture and structured question and answer session.

(d) Test purposes - How many locations are needed to meet project objectives? It may, for example, be necessary to include locations with a range of characteristics in order to adequately test project hypotheses. For example, two goals of the ITC Project were to examine inter-regional communications needs and the potential for a Pan-Arctic Inuit broadcasting system. This resulted in a decision to include the maximum number of regions in the ITC system.

(e) Other ways of involving communities - Consider methods of involving communities other than through participation in the satellite network. ITC resolved the desire to serve all communities with the practical constraints by including only six communities in the ANIK-B system but offering all Inuit communities the means to participate in a videotape distribution system.

4. <u>Selection of locations</u>

The community selection criteria should be explicit and able to withstand scrutiny in the event of criticism. The following examples of the selection criteria used by ITC should serve as illustrations only. Each project will develop its own criteria peculiar to its objectives.

(a) Demonstrable support for the project from the municipal body, including a commitment to donate facilities and services to the project; e.g., donate the use of buildings, lay the gravel pad for the ground station, donate and install a pole for the TV antenna, assist in equipment installation, etc.

(b) High level of community interest in the project's communications services as evidenced by the amount of related local activity, local lobbying efforts to obtain similar services, etc.

(c) Local availability of communications facilities, especially production capability that could make contributions to the project's programming needs.

(d) The availability of interested and talented potential staff.

(e) Location within the appropriate satellite footprint; (transmission or reception beam).

(f) Availability of adequate quantity and quality of telephone lines for back-up communications.

(g) Ease of access for purposes of repairing equipment.

5. <u>Transmit/receive capability of locations</u>

The decision as to a location's transmit/receive capability will determine its participation capacities. Will a community have video and audio transmit capability, video receive-only, audio transmit? This decision is a crucial one because it sets up a hierarchy of technology. The community with the video transmitter has the capability to dominate the system. Any live video programming will of necessity come from the video transmit location and on-camera personalities (teachers, resource people, etc.) will either have to be from the community or be flown into the community. Conversely although the video transmit location can dominate the network it can also feel deprived because of being unable to see the speakers in the audio-only communities. See section on System Design Factors-Symmetry (p.69) for further discussion of this issue.

As examples, here are some of the criteria that ITC considered in the selection of the video transmit location.

(a) Availability of production studio and facilities. (Or adequate space and resources for their construction.)

(b) Availability of local trained production crew.

(c) Availability of resource people, instructors, on-camera personalities, etc. for live broadcasts.

(d) Good transportation links in order to fly in other resource people and for the shipping of pre-taped programs from other centres.

6. Programming origination

The selection of program origination sites will again determine the participation capability of the locations. ITC established some production capacity in each of the ground station sites in order to increase the communities' ability to participate in the system. The evaluator of the Ironstar Project concluded that the communities without video production capability were left "always in second place to the visual programming". (14, p. 2)

7. Satellite schedule

When and how often will the project use the satellite? What months, days, hours of the day and hours per week? Here are some considerations:

(a) Time of year - The behaviour patterns of your target audience/users must be considered when selecting the time of year that broadcasting will take place. Do the audience/users have seasonal activites that would take them out of the community or otherwise make them less available for or interested in the satellite project? Are you dealing with students with a fixed year term? The IITV Project found that knowing and accommodating the audience behaviour patterns is crucial. "It's dumb to transmit a series of programs on forestry at a time when the foresters are all out working in the forest." (Robertson #14)

(b) Days and hours of the day -

i. Schedules must be adapted to the daily timetables of your target audience/users. The Hermes telehealth projects found, for example, that scheduling continuing education at 9 a.m. conflicted with doctors' other commitments. (17, p. 9) When schedules have to be co-ordinated among a number of different user groups or communities some conflict is unavoidable. For example, ITC was successful, in some cases, in having conflicting activities re-scheduled (eg. one community's radio society bingo) but in other cases had to live with the competition, (eg. another community's movie night.)

ii. Time zone differences have to be taken into account. The ITC Project encompassed three different time zones and it was quite a juggling act to attempt to schedule broadcasts so as not to interfere with meal times in three different time zones. It proved to be impossible, and there was a lower rate of participation in those communities with the most inconvenient satellite times.

iii. If you are sharing the satellite transmission buildings, other uses of the facilities have to be taken into account. For example, in some communities ITC used the municipal office meeting room for teleconference transmission and had to try to schedule satellite time around regular council meetings. The sharing of rooms will likely necesitate the setting up and dismantling of equipment before and after every transmission.

(c) Length of programs - The Hermes evaluators concluded that, for tele-education projects, satellite sessions should be comparable to regular class periods in duration (one hour or less). (23, pp. 114, 120) Several different sessions can be scheduled back to back but remember to leave time for crew changes or breaks, studio set-up, the ushering out of old audiences and the settling in of new ones, etc.

(d) Number of hours per week - The number of hours of satellite time that can be feasibly produced will depend on the programming format. Production time and costs vary dramatically depending on whether the program is a teleconference, a live broadcast with graphic display and blackboard use, a pre-taped program, etc. The IITV Project found that a professional-looking video-tape production required fifteen hours of production for every hour of final product. More time is required if the production crew is not fully trained. In contrast, "With live television the amount of preparation is much less.

You see it with all the warts on and it's not as polished as the pre-taped product. But it doesn't cost you as much either." (Robertson #14)

The amount of programming that can be produced will depend on production capacity and lead time available for pre-taped production, availability of staff and facilities for live studio productions and the availability of suitable pre-taped material from other sources. It is important to build in time for program preparation, practice sessions/dry runs, etc. Satellite time should also be scheduled to meet project administrative needs.

In addition, when considering the number of hours of programming per week, the users' schedules and practices must be considered. For example, some of the Hermes telehealth projects found that they had too many concentrated hours of programming aimed at doctors who, as it turned out, where unable to devote more than a limited number of hours per week to continuing education. (17, p. 9)

8. Programming format

How much of the programming will be live, how much pre-taped? How much interactive programming will there be? Will capacity be required for graphics, slide display, blackboard work? These questions must be answered in order to prepare for systems design and the answers will vary according to project objectives and resources.

9. Method of audience/users participation

How will the audience/users participate in the programming? Will they be required to come to a specific location? Will there be local broadcast of the satellite transmission into people's homes and will people be able to phone from their homes into the system? Will students be able to participate directly from the classroom? The answers to these questions will depend on the project objectives. It is important to keep in mind, however, that **every increase in project flexibility will mean an increase in operational complexity** and the potential for loss of transmission quality. (Unless funds are unlimited.) These questions are further discussed in System Design. (p. 66)

II FINANCING

A. FINANCIAL ARRANGEMENTS WITH FUNDING SOURCES

1. Project management must have budgetary control

Project management must have a financial arrangement with the funding source(s) that assures management day-to-day budgetary control. This control is essential to permit efficient and appropriate management of a project that will require continual modification throughout its life time and demand on-the-spot decision-making.

Under the terms of ITC's funding agreement with the Department of Indian and Northern Affairs (DINA), a specified amount of funding was made available to ITC for the full three years of the project. This funding was allocated to ITC on a quarterly basis by approval of the Liaison Committee (one representative each from ITC, DINA and DOC) on the basis of budget requirements submitted by ITC. From ITC's point of view the agreement provided an excellent consultative and flexible process by which budgets could be modified to reflect changing circumstances. The setting of the budgets and the day-to-day financial control was totally in ITC's hands. From the funder's point of view, the quarterly approval process meant that the project could be continually reviewed to make sure that funds were being spent according to the terms of the agreement.

2. Funds should precede expenditures

The agreement with the funding body should provide for the availability of funds prior to expenditure. If money is available 'up front' the total project costs will be lower, the credit rating of the project will be maintained and management headaches will be greatly reduced. Money in advance means that the project can benefit from cash discounts, have better bargaining power for items in short supply and does not have to pay interest on borrowed money. It also eliminates the energy and time required to deal with irate creditors, especially those from whom the project is re-ordering.

ITC's agreement with DINA provided for funding in advance of expenditures and greatly assisted project administration and financial management. Other projects have found it necessary to seek funding from a variety of sources, each with their own funding procedure. Although there is agreement that money 'up front' is desirable, it is not always possible to obtain. (Page #12)

3. Budgeting flexibility is essential

The budgeting should be global rather than line item; i.e., the budget should not be rigid regarding the earmarking of specific amounts to certain budget items and there should be flexibility between the capital and operating categories of the budget. This budget flexibility is important to allow for changing project priorities, to encourage additional fund-raising and to allow for the donation of items to the project.

In some cases, however, the project may have no alternative but to accept budget restrictions. Many government departments, for example, will not fund capital expenditures, only operating, and any capital expenditures must be accounted for and funded separately. Some funding sources may deduct any donations or funding from other sources from their funding allocation. (Martin #10) Other funders may demand the purchase of specific equipment for their own research purposes even though the equipment is not appropriate to the project's objectives and ends up sitting on the shelf. (Robertson #14)

ITC had total budget flexibility within the general terms of the agreement and with the approval of the Liaison Committee. As a result, ITC was able to seek other financial support throughout the project's life. For example, training budgets had been included in the original budget submission to DINA. It turned out that ITC was able to obtain special training money from another federal government department. The training allocation in the DINA budget was re-directed to project expansion (eg. adding another television transmitter to serve an additional community) and unforeseen costs, (e.g., the unanticipated need for a staff position of programming co-ordinator).

4. Obtain long-term funding commitment

As stated under Project Conception (p. 7), it is clearly desirable to obtain a funding commitment from the funding sources for the full term of the project. There is an obvious danger inherent in beginning a project without securing its future. Community consultation and the training programs will be among the first project activities undertaken. A project that is aborted once this process has begun will lose organizational credibility and it will be hard to mobilize community support for subsequent projects.

The reality is, however, that most projects have to renew their funding on an annual basis and some projects are forced to continually scramble for funds for the project's duration. In summary, fight for a commitment for the full term of the project and, if you don't get it, carefuly consider the pros and cons of proceeding without it.

5. Quantify institutional contributions

It is valuable to attempt to quantify in dollar terms the contributions of sponsoring organizations, participating agencies, communities, etc. This information will demonstrate to the potential funding sources the degree of cost-sharing of the project. It also allows management to see the true cost of the project and to guage the potential for operating on a cost-recovery basis.

B. FINANCIAL ADMINISTRATION

1. Fast and efficient accounting services are essential

In order for management to keep on top of a project that is fast-paced, decentralized and capital intensive the project's accounting services must be fast and efficient. Cash flow statements must be made available to management at the end of every month and must include calculations of money committed but not yet paid out. Funding agencies will have certain financial reporting requirements that may include monthly financial reports. Bills must be paid promptly in order to maintain good working relations with equipment suppliers, local hotels, cartage companies, etc. whose good will is essential to maintain the project's financial credibility in the community.

2. Account for depreciation realistically

Budgeting and accounting must take capital depreciation into account in a realistic manner bearing in mind, among other things, the life of the project. For example, ITC wrote-off its videotape equipment in one year. This was considered to be appropriate because the equipment was used in working conditions of extreme temperature change, dryness and dust and was being handled by inexperienced people.

3. Have adequate insurance coverage

Make sure that the project has adequate insurance coverage for project staff, for third-party liability, fire and equipment theft and damage. Both the staff and the Board of Directors should be insured as named individuals. (Martin, #10) ITC was unable to obtain all perils insurance coverage for project equipment because of the severe northern operating conditions. No doubt coverage could have been obtained if money was no object but ITC concluded that it would be cheaper in the long-run to buy the more limited coverage that was available and cover the exceptional accidents itself.

4. Supplement funding with donations

Donations of money, equipment, time, etc, can be an excellent supplement to project funds (as long as they are permitted by the funding agreement). ITC received equipment donations from cable companies, broadcasters and institutes of technology. It must be noted, however that using donated equipment can sometimes be a false economy. Each item should be carefully judged on its own merits, taking into account the cost of repairs, the availability of spare parts, the degree of reliability required from the equipment and the cost of making the equipment compatible with the rest of the project equipment. The equipment may end up costing you more than the price of a new unit if it breaks down in the field and a costly maintenance trip is required or the project is delayed while the item is sent out for repair. **When in doubt err on the side of caution.**

III MANAGEMENT

A. THE MANAGEMENT TASK

Before looking at the principles of management that should be adopted for satellite projects it is important to understand the nature of the management task. The following are several traits that characterize satellite projects.

1. Dispersed staff

The staff of a satellite project are usually dispersed in a number of different locations rather than being together under one roof. There may be a small staff at each ground station location. The management system must be designed to effectively manage staff at a distance.

2. Multi-organizational operation

Regardless of the nature of the project there will be many organizations involved; whether as co-sponsors, program producers, users of the system, audience. Sometimes the organizations will be new to each other and it may be some time before effective communication is set up. (Martin #10) Hence, there is an enormous co-ordination task.

In addition, the multi-organizational operation means that project management will require the co-operation of departments and individuals that are autonomous and not in a line relationship to project management. As the IITV co-ordinator explains, "The ability to command does not exist. So there's a great shift in attitude required from a conventional top-down administrative style to one of a sharing and a partnership relationship with equals who often have a different set of priorities". (Robertson #14)

3. Multi-disciplinary operation

A satellite project is characterized by the number of different disciplines that have to work together towards a common goal. Engineers, academics, medical practitioners, community animators, managers and television producers find themselves working side by side in situations which demand effective communications and the breaking-down of inter-disciplinary barriers.

4. Fast-paced

The demands of a satellite project put tremendous pressures on production schedules, equipment implementation schedules, preparation of the audience, etc., all of which results in the need for decisions to be made quickly, communicated quickly and acted upon immediately.

5. Under-staffed

Satellite projects are frequently under-staffed at different stages of their operation. This happens because staff loading (the number and kind of employees required at any one time) can vary dramatically with the various project phases, from planning to implementation, from operation to wrap-up. The variation is unique for each project and depends on many factors including the project's objectives, the amount of new equipment to be installed, the training required, the number of participating organizations, etc.

Staff have to be hired and laid off at various stages according to the project requirements and sometimes there is a significant gap of time between the identification of a new staffing requirement and the filling of the job. In addition, it is sometimes the wiser decision to have existing staff carry an extra workload rather than training someone from scratch, especially if the project's end is in sight.

6. Continually changing

Working with experimental technology and breaking new ground in program delivery means that the project must adapt continually if it is to profit from experience and reflect changing realities. The changes might be relatively minor ones such as the purchase of a new piece of equipment, the development of a different teleconferencing technique, a new programming format, a new audience participation method, etc. Or they might be major changes in target audience, system design and project location.

7. Intensive

The project operates at a high level of intensity because it has a specific time frame with a known cut-off point and the requirement to obtain a great deal of information and experience in a relatively short period of time. Memorial University, for example, delivered approximately two years worth of continuing education courses in three months. (House #4)

8. Reliance on the telephone

The project relies to an extraordinary degree on telephone communications because of the telephone's speed immediacy, simplicity of use and availability. The amount of telephone use will be determined by a variety of factors. Use will increase, for example, if the project suffers from technical problems requiring the use of the commercial telephone system for repair calls. Telephone use will decrease relative to the amount of satellite time that is set aside for administrative matters. Because of the project's reliance on the telephone, management techniques will have to be set up to keep a written record of transactions and commitments made over the telephone.

B. MANAGEMENT PRINCIPLES

There is no one management style that is recommended for satellite projects. Several management styles were used and found to be effective in carrying out the Hermes projects. (17, p. iv) A comparison of 45 inter-active telecommunications projects in the United States also found that most projects managed adequately without special management techniques. (13, p.57)

Although special management techniques or styles are not required the project management structure should incorporate the following principles.

1. Integration into sponsoring organization

As stated under Project Conception (p. 3), the management structure must be well-integrated into that of the organization which is sponsoring the project. This will mean an on-going commitment of resources from the organization and a greater chance of the project results being institutionalized (if this is an objective). In addition, integrating the project into the organizational structure avoids establishing a special status for the project and incurring the resentment and resistance of other staff. (House #4)

On a day-to-day level it can also mean the provision of support services to the project such as printing, photocopying, translation, etc.

2. Autonomy within the sponsoring organization

Project management must have enough autonomy within the sponsoring organization that they can run an intensive operation in an often volatile environment where the momentum must be sustained. It obviously involves a delicate balance to arrive at an autonomous structure that is fully integrated into the sponsoring organization. What is required is the full support and confidence of the sponsoring organization, including the allocation of resources, coupled with delegation of day-to-day decision-making to project management. As the IITV Project director puts it, someone should simply say, in the ideal, "Here's the project, we approve your plan, the funds are there and we'll assist you but we're not going to second-guess you." (Robertson #14).

3. <u>Flexibility</u>

The management structure must be flexible enough to respond to the knowledge gained from the field and to modify the project according to the demands. As the Telehealth Team of the Department of Health and Welfare explains, "There will be shifting policies and changing personnel needs and systems which the telecommunications system must fit. Otherwise, one may face an erosion in the base of support for the system". (28, p. 25)

4. <u>Efficient administration</u>

The project must be set up to handle with efficiency, speed and the minimum amount of paper work, all the administrative needs of a fast-moving project with extensive field operations. There must be simple and efficient procedures for arranging and paying for the transportation of people and equipment, procuring of supplies in the field and paying for goods and services. There must be a local purchasing procedure that is acceptable to local suppliers and workable for the staff. The key is to set up a system that maximizes speed and minimizes paperwork while still allowing management to retain budgetary control.

Morale of the fieldstaff is crucial in a project of this nature and nothing damages it faster than slow or inadequate response from headquarters. The timely arrival of paycheques is extremely important to staff morale. In some remote communities post-dated cheques, mailed a week to ten days early would not have arrived by payday. In such cases ITC made arrangements with local organizations, such as the co-op to make out the cheques, for a service charge.

Staff are required to travel on short notice in these projects and this requires a procedure for reserving and paying for travel and accommodation. ITC found that the quickest, most efficient method was to use the services of one designated travel agent who became familiar with the routings and carriers of the project territory and was willing, if required, to make travel arrangements after regular working hours and to be contacted at home.

5. Strong field presence

Public service satellite projects will only work to the degree that they are accepted in the field by the users. To ensure this acceptance the project must have a strong field presence. There must be a local co-ordinator in each community who is responsible for the operation of the local satellite equipment, identifies and resolves local operating problems and generally facilitates use of the system. This person, or a trained back-up should be in attendance at every transmission. This is essential in order to brief new people on the use of the system and to deal with equipment problems.

It is essential that all staff who make decisions about the system experience it first-hand from the receive communities' perspective. If senior management are located at the site of the video-transmitter then they should travel to the remote sites to experience the system from the other end.

Although this would not necessarily apply to all projects, ITC's Project was strengthened by being directed from the field. The project manager was based in a remote community with video receive and audio transmit capability. This meant that he experienced the system continually from the receive end, along with the other users, and was accordingly sensitive to both the needs and desires of the users and the system's limitations.

6. Back-up staff

It is important to have back-up staff for key operations. This can be done in two ways; by training additional part-time staff who make themselves available on an 'as required', basis or by encouraging existing staff to learn a variety of functions. For the community co-ordinator position ITC trained back-up staff and members of the user organizations who worked on a part-time basis. At the video transmit site the staff working in the studio were trained in a variety of functions and were able to fill-in for others as needed.

7. Responsiveness

The project must be able to respond immediately as situations arise. In order to ensure this, a decision-making authority must be constantly available throughout the project, and particularly during the broadcast phase. This person's identity must be known and he/she must be always 'on call'.

8. Co-ordination

Information flow is the life blood of a satellite project. (Kerr #6) There should be one staff member who acts as a point of co-ordination and through whom all major project information is routed. In ITC's project this person was the operations manager. In Memorial University's project it was the project co-ordinator. (21, p. 15) When more than one organization is sponsoring the project the co-ordination requirements are compounded. It is essential to develop an integrated reporting system that will allow an overview of the complete project. (9, p. 40)

9. Strong staff communications network

In a physically decentralized operation such as this, strong staff communications networks are essential to avoid confusion, to allow for quick decision-making that responds to field priorities and to maintain staff morale. There is a need to be continually alert to the dangers of staff isolation. A case study of the ATS-6 satellite health, education and telecommunications projects found that many of the problems in the project were directly traceable to failures of administrative communications. "When people in remote sites criticized their own projects, the issue of communications between the local and central staff was one of the first things they mentioned." (10, p. 71)

Here are some of the communications tools that can establish a strong staff communications network.

(a) Telephone - The telephone, next to the satellite system itself, will be the key communications tool of the project. Mail is too slow for most contacts and, once satellite transmission begins, most staff will not be able to free themselves to travel. A large allocation for telephone calls must be included in the budget. A system should be established for keeping a record of the content of telephone calls for purposes of follow-up, confirmation of decisions, etc.

In the ITC Project telephone contact was so important that two telephones were installed in the operations manager's office in the south. One telephone served as a 'hot line' between the office of the project director in the north and the manager's office, with the telephone number having very restricted circulation. This meant that priority calls could always get through, even though the regular phone was in constant use.

(b) Facsimile - Facsimile units (telecopiers) were an essential tool in the ITC Project and are vital to a decentralized operation, especially one operating in areas where mail delivery is slow and unreliable. The use of facsimile means that letters can be drafted in one location and signed and mailed from another. Important correspondence can be relayed quickly. Agendas can be 'faxed' prior to meetings, thereby improving the efficiency of the meeting. In the Moose Factory telemedicine experiment fascimile was used, following medical consultation,to transmit a typewritten and signed report to the hospital for the medical record. (5 p. 14)

One cautionary note; telecopiers require a lot of transmission time and can therefore be expensive to operate. Yet they are so convenient that there is a tendency to use them at every opportunity. There should be careful monitoring to ensure that use is restricted to priority items, otherwise the budget will suffer. (See Programming Procedures p. 56 for a discussion of the use of fascimile in distributing program support material.)

(c) Staff teleconferences - The ITC Project made extensive use of staff teleconferences using both satellite project time and regular commercial lines. Teleconferences simplified the process of information gathering and decision-making when there were people in more than two locations involved. Teleconferences work best when an annotated agenda is circulated in advance and when people have an opportunity to think about the topics prior to the call. A chairman and a recording secretary were appointed for each call. Follow-up summaries of the call were circulated to all participants.

The ITC staff responsible for the satellite scheduling and programming content set aside satellite time weekly for staff meetings linking staff in all six satellite communities. Summaries from these teleconferences were used to keep all staff up-to-date on field activities and as records for evaluation purposes.

(d) Reports -

i. Co-ordinator's reports - The project co-ordinator should be responsible for writing regular reports that summarize project activities in each of the various areas - program development, hardware procurement, licensing etc. These reports should be circulated to all staff to keep people up-to-date on events, to ensure that there is no duplication of effort and to support that very important feeling of team endeavour. ITC prepared quarterly reports that were required by the Liaison Committee (see p. 25) under the terms of the funding agreement with DINA. These reports were circulated to all staff and provided a useful summary of the project's progress.

ii. Reports from the field - Reports from the field are essential to both project management and evaluation but are not easy to obtain. Field staff may find it difficult to write reports on a regular basis. In addition, full-time secretarial support is usually not warranted in field locations and photocopy facilities may be scarce. ITC solved this problem by having field-staff phone in their reports on a regular basis to the project secretary who then typed and circulated them. This can be an expensive procedure, however, and should be restricted to necessary information.

When the technical supervisor was in the field he made a report on audio-tape at the end of every day which provided an excellent briefing for the manager.

(e) Workshops - Face-to-face workshops are a very important supplement to teleconferences. ITC found that teleconferences are very effective for information transfer but cannot replace meetings for discussion of personal or controversial issues. However, the demands of the satellite transmission mean that large staff meetings are possible only before the satellite phase begins or when it ends. ITC's experience was that workshops work best when they are held in a remote community with few distractions and when they are very intensive, (i.e. attempting to cover a long agenda in a relatively short space of time). Agendas should be circulated well in advance of the workshop, soliciting input from participants.

(f) Newsletters - Newsletters are not suitable for internal project communication, although they are a good public relations tool. (See section on Public Relations, p. 45.) For example, Memorial University's project started a newsletter but discontinued it after two issues. They found that other contact was sufficient and made the newsletter redundant. (15, p. 18)

(g) Evaluator's feedback - The evaluator must be viewed as a key link in the internal communications network. He/she will be in the field extensively and be in close contact with the staff. The evaluator can provide an extremely important liaison function both to report to management on the perspective from the field, including potential problem areas and to inform field staff of broader project activities. A skilled, committed evaluator can serve as an excellent release valve and put things in perspective by providing an important overview to staff. This approach to evaluation means that problems are dealt with as they arise, rather than simply being recorded to appear in a final evaluation report.

(h) Paging units - Memorial University rented paging units for their co-ordination staff to allow them greater freedom of movement. It was concluded, however, that the units were only ncessary for people on call and, in fact, most people could be reached easily enough by conventional means. For one thing, the paging units are limited by their short range. (10-15 miles) (House #4) The IITV project used a paging unit for one of their part-time staff who was on call in case of technical crisis. "It was useful only at the very beginning when we were getting things running." (Robertson #14)

10. Clear lines of authority

In every organization it is essential that all the members have a clear understanding of the lines of authority. Responsibilities must be assigned and lines of reporting clearly defined. ITC made a point of continually reviewing and revising job descriptions and organization charts. This process is highly recommended because it enabled the staff to understand their roles and their relationship to their fellow staff members.

Establishing clear lines of authority becomes doubly essential when the project has the involvement of more than one organization. For example, there may be debate over the nature and the quality of the programming. To the extent possible, the responsibility for programming decisions should be set out at the beginning of the project. For example, STEP, (Satellite Tele-education Program in British Columbia) had on-going problems in this regard with the management of their planning consortium. Some programmers refused to modify programming on the basis of audience evaluation feedback. (22, p. 19)

11. Early action procedures

The management structure must support early action on long lead items. For example, obtaining broadcasting licences, construction permits, fire permits etc. will all involve more time than anticipated. There will be long waiting periods for correspondence exchange, etc. Equipment must be ordered, in most cases, months in advance of delivery dates. Management must be structured to anticipate and act on these delays.

12. Follow-up procedures

A management system for follow-up of requests, applications, equipment orders, etc. must be set in place. Extensive use of the telephone should be made for follow-up. In covering letters, request a telephone call if the application, etc. can't be responded to immediately. The telephone charges are well justified by the time saved on items which would otherwise result in project delay.

13. Careful attention to staff morale

Management structures should reflect the need to pay careful attention to staff morale. The key to good staff morale is a sense that every staff member's participation is essential to the project and that their individual talents, needs and contributions are recognized and acted upon. This attitude should pervade all management structures whether it's the development of individualized training programs, a procedure for soliciting staff participation in all decisions that effect them, or simply a method for informing staff on the status of their equipment or supply requests.

14. <u>Participatory decision-making</u>

The management structure should include methods for participatory decision-making. This is an important feature in a project that is decentralized, fast-paced and dependent on input from the field. Participatory decision-making can ensure that the project responds to audience priorities and results in greater staff participation and cohesion. In order to work effectively it should be based on clearly understood responsibilities and well defined lines of authority.

The most important element of the ITC management structure was its emphasis on participatory decison-making. The Project Director had the clear and final authority on all matters (as delegated by the ITC Board of Directors) but a great deal of decision-making was delegated to the community level. Programming decisions were made by the community co-ordinators who referred controversial or difficult decisions to the Project Director. Project policies took staff recommendations into account. The project evaluator concluded that this decision-making process was a key factor in the project's success, especially its low staff turnover (which was without precedent in native projects) and high level of staff satisfaction.

IV USER PARTICIPATION

A. USER PARTICIPATION PROGRAM

The success of a public service satellite project is highy dependent on the degree of involvement and support from the target audience/users. Their participation can only be assured with an extensive participation program. The target audience/users might be medical practitioners, students or the community at large but the principles of a successful user participation program are the same.

The importance of this stage of the project is stressed by the following finding from the evaluation of Memorial University's project "Users who felt more like participants than observers during the broadcast period tended to increase their overall support for the project, tended to come to view it favourably with respect to face-to-face interaction, and increased their willingness to continue to use the system in the future." (21, p. 123) The evaluator concluded that "whether one feels like a participant or an observer is strongly influenced by what happens prior to implementation". (21 p. 124)

The user participation program should be based on the following principles.

1. Provide adequate funding and full-time staff

   A user participation program should be established with adequate funding and full-time staff in each ground station community. The number of staff required in each community is dependent on target audience size or number of potential users and will vary with the project's objectives. ITC had one full-time co-ordinator in each community with part-time assistance and support from other local staff. Other projects have relied on staff appointed from the participating organizations.

2. Hire locally

   The field staff should be from the community or, at absolute minimum, know the community very well. Outsiders will not have the access to the community that a local will have. An outsider will take some time to become 'acclimatized' and his/her work may be hampered by local resentment. (See section on Staffing (p. 12) for further discussion of this issue.)

3. Train staff

Staff must be given a thorough training to prepare them for implementing the participation program. See section on Training (p. 62) for more details.

4. Begin early

The participation staff should be working in the communities or with the user population months before the start-up of satellite transmission. The Telehealth Team found that "The lead time for promotion to potential student populations is approximately 6 to 8 weeks". (28, p. 37) In the case of the ITC Project the community co-ordinators were working in the communities for four months prior to satellite transmission. This length of animation time was required because the project had the goal of making community organizations responsible for a certain portion of the satellite programming.

One complicating factor is that early publicity is likely to create some impatience and annoyance. Some people may tire of talking about the project and become eager to 'get on with it'. Community staff must be sensitive to and prepared for this possibility.

5. Seek community donations

An important method of community participation is the seeking of community contributions and donations. In general, ITC's principle was to attempt to get local supplies and short-term labour donated by local organizations; community council, housing association, etc. to encourage local involvement. This practice required that the local groups understand the project and be convinced that it was worthy of their support. Their contribution, in turn, resulted in them having a stake in the project. Given the amount of follow-up this practice usually requires it is often simpler to hire a local contractor or purchase your own supplies, but to do so would greatly diminish the opportunities for community participation.

B. METHODS FOR USER PARTICIPATION

The amount of participation desired from the users or target audience will vary with each project but, in general, the more participation, the more successful the project. Some projects, like ITC's, made the community groups themselves responsible for certain programming, others solicited programming suggestions from the audience. Memorial University recommends that projects identify and use special talents within the audience. (21, p. 192) The IITV Project found that their most successful educational programming resulted when audience activity took place rather than passive reception. (Robertson, #14) Whatever the community participation goal, the following procedures will have to be established, with the goal of involving the user group or target audience as soon as possible.

1. <u>Inform users prior to satellite transmission</u>

   The audience or users need to know the goals of the project, what the system can do for them and how they can get involved. The user or target audience is often neither familiar with satellite technology nor its potential uses and this stage of community animation will tax the animator's ingenuity. Methods must be developed to suit the particular needs of the project and the following methods used by ITC's community co-ordinators will serve as examples.

   (a) Face-to-face meetings with individuals and organizations;

   (b) A booklet describing potential uses, giving the satellite schedule and the transmission sites;

   (c) A slide show transferred to 3/4" videotape which used graphics to explain the satellite technology and the system operation;

   (d) A video-tape from another completed satellite project showing samples of their programming;

   (e) A looseleaf folder including graphics from the slide show that could be taken out on the land and discussed with people at fishing and hunting camps without the need for display equipment;

   (f) Interviews and phone-in shows on the community radio station;

   (g) Community screenings of video-tapes, followed by discussion;

   (h) Airing of project video-tapes on community-access TV;

   (i) Interviews and advertisements in the local newspapers.

An additional recommended method:

(j) Mock demonstration for the users, linking rooms in a simulation of the system. (Martin #10)

2. <u>Keep users informed throughout the operations phase</u>

Methods must be developed to keep the users informed throughout the operations phase and the following techniques used by ITC will serve as examples.

(a) The community radio station was the most effective information tool during the operations phase of the project. The community co-ordinators used the radio to announce upcoming broadcasts, request specific participation and explain technical problems and cancellations.

(b) Announcements were made during satellite broadcast transmission and these could be heard/seen in viewers' homes.

(c) Weekly broadcast schedules were advertized in the local newspaper, where available. Other communities, without local newspapers, put up posters in places like the grocery store, the post office, etc.

(d) On-going meetings with community organizations were required because of staff turnover and the importance of thoroughly briefing new decision-makers and participants.

3. <u>Establish user feedback procedures</u>

Quick and efficient procedures must be established for user feedback to allow mid-course modifications to be made in the policies and the programming.

The following examples of ITC's methods serve as illustrations only.

(a) In the case of the ITC Project the audience/user's program suggestions were incorporated directly into the programming schedule by the community co-ordinators and the programming co-ordinator working in tandem.

(b) Feedback from the users was gathered at the end of program transmissions (in the case of live programming) by the community co-ordinators and passed on to the programming co-ordinator at the weekly staff meetings. The minutes of these meetings were circulated to all staff. Staff attempted to incorporate user suggestions into immediate program planning.

(c) Surveys were conducted at various stages in the project for evaluation purposes. They were designed by the evaluator and implemented by local staff. The use of local staff was designed to reinforce their awareness of the need to be responsive to the local audience and the user. Some surveys were done by telephone, others by door-to-door interviewing.

Other recommendations:

(d) An advisory committee drawn from a consortium of users can provide on-going feedback to the project. (29, p. 2)

(e) Memorial University recommends designating opinion leaders working in the disciplines of the users to provide feedback and advice to the program producers. (29, p. 2)

4. <u>Inform users about the results of their input</u>

Methods should be put in place to inform the users about the way their programming suggestions, complaints and advice have affected the project. They should be made aware of the results of their input on the project.

In the case of the ITC Project this was done through the work of the community co-ordinators.

V PUBLIC RELATIONS

Aside from the audience or users, the project is required to communicate with several different publics:

A. General public;
B. Project supporters;
C. Decision-makers; and
D. Sponsoring organization.

Every project develops public relations techniques that are appropriate for its particular circumstances. The following section gives details of ITC's methods, some of which may not be applicable to other projects. The general principles underlying the establishment of a public relations program, however, have universal applicability.

The ITC Project was able to borrow public relations staff from its parent organization. It is highly recommended that some such arrangement be made for obtaining professional public relations services.

A. GENERAL PUBLIC

Public relations can be a time-consuming and relatively costly endeavour that is, however, essential to the long-term success of the project. Publicity is necessary to gain broad public awareness and support for the project which will be important for both current and future work. Accurate and effective public relations can be key in promoting community or user enthusiasm and can assist in attracting good staff.

When publicizing the project, however, beware of making exaggerated claims about its uniqueness or break-through accomplishments. There is a very real danger of over-selling a project and promising more than can be delivered. In addition, colleagues from other projects who may have assisted you in your endeavour, will be alienated by presumptuous slogans like "Canada's first". (House #4)

1. Concentrate on a sub-grouping

Staff and resource limitations usually require projects to concentrate their public relations efforts on a sub-grouping of the general public in order to maximize results. ITC made a distinction between general public-northerners* and general public-southerners and, while not ignoring southerners put their primary emphasis on communicating with northerners. Here the public of primary concern was Inuit communities that were not part of the satellite project network. The following methods are set out as examples of the way that this subgroup was kept informed about and involved in the project.

(a) "Name the project" contest

A "name the project" contest was run which was open to all northerners and in which the prize was a trip to the Kennedy Space Centre at Cape Canaveral, Florida to watch the launch of the Anik B satellite.

(b) Public relations booklet

A public relations booklet describing the project and its goals was distributed to every household in Inuit communities through distribution at the local post-office. The booklet was printed in bright colours with professional graphic design. The colours and the graphics were extremely well received and continued as project themes, making project material immediately identifiable.

(c) T-Shirts

T-shirts were printed up by a Northern co-operative with a design created by a local child. The t-shirts were advertised through Northern magazines and newspapers, sold by local staff and given to supporters in recognition of donations.

(d) Newsletters

Two newsletters were published during the project and they were distributed to every household in Inuit communities through distribution at the local post-office. The length of time required for translation and printing meant that the news was pretty stale by the time the newsletters were distributed but they were of interest to people outside the satellite network, who were not as up-to-date as the six project communities.

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* In this context "northerners" refers to people living in Canada's North and "southerners" to the balance of the Canadian population.

(e) Community visits

A regional co-ordinator visited every community in the three main project regions and met with the local community council, conducted radio phone-in shows and held community meetings to discuss the project.

(f) Video-tape distribution

An attempt was made to involve all Inuit communities directly in the project through the establishment of a videotape distribution system. ITC offered to cost-share the purchase of 3/4" video playback equipment with the community council. Videotapes from the project were then shipped to the community for local screenings.

g) Satellite participation

Certain people in communities outside the satellite network were invited to participate in broadcast transmissions either by flying in to a ground station community or by phoning in to the network.

2. <u>Develop cost-effective techniques for reaching the broader public</u>

Although concentrating on a sub-grouping can maximize effectiveness, some cost-effective techniques must be developed for reaching the broader public. The following are examples of ITC's methods.

(a) The southern public was informed about the project mainly through the press. For that reason it was important to keep the press informed about the project through press releases, information packages, press kits, etc. This information also met the information requests from students writing papers, from teachers, from other projects, etc.

Press contacts must be handled very carefully. The Quebec Telehealth Project recommends that one person be identified as the official press liaison and that all press contacts be co-ordinated through that person. They found that press coverage which is inaccurate, misleading or that merely overlooks significant details can be damaging to the project. (Page #12) The information demands from all sources can be extremely time-consuming and can effectively disrupt project work if not well handled. It was ITC Project policy (although a difficult one to enforce) that no interviews were given unless the interviewer had first read the material in the information kits.

(b) Loan of videotapes

A couple of summary tapes describing the project and showing examples of programming were available for loan or purchase. They were an excellent information tool and were sent to national and international conferences. The project also loaned videotapes of the satellite programming for local screenings, classrooms viewings, etc. but top priority went to the filling of Northern requests.

(c) Support for a film about the project

ITC supported the production of a film about the project, produced by an independent film-maker, which will play an important role in on-going public relations.

(d) Conference papers

ITC staff presented papers at selected conferences.

B. <u>PROJECT SUPPORTERS</u>

1. <u>Create a network of supporters</u>

Creating a network of supporters, drawn from the general public, is an important task, the long-term benefits of which make it well worth the effort. Supporters of the ITC Project were able to assist in the following ways.

(a) Comment on project's feasibility

Several people with expertise in communications were asked to comment on the feasibility of ITC's project plan. These comments were useful in the project design and in fund-raising strategy.

(b) Support letters to government

Supporters wrote letters to the Federal Government stating their support for the ITC Project at a time when the funding appeared to be in jeopardy. This support was instrumental in the ultimate success of the funding application.

(c) Support for licence applications

Supporters wrote letters to the Canadian Radio-television and Telecommunications Commission (CRTC) supporting ITC's licence application for an Inuit Broadcasting System.

(d) Donations of equipment

The total value of equipment donated to the project was approximately $10,000, which represented an important contribution to the budget.

(e) Financial donations

Individuals and organizations contributed time, money and services to the project throughout its duration; e.g., studio time and crew, carpenters' services, etc.

(f) Special projects

Organizations and individuals carried out a range of different support activities for the project. Some donated their time as trainers, one group organized a write-in campaign to secure support for on-going funding needs, another organization set up a southern screening of project tapes.

2. <u>Work at retaining your supporters</u>

To retain your supporters, it is important to spend some time and effort keeping them involved.

(a) Write thank-you letters

Your supporters will appreciate having their contribution acknowledged and would like to know the results of the funding application, the licence application, etc.

(b) Keep them informed

Continue to keep your supporters informed throughout the project through newsletters, copies of press releases, etc. Don't just contact them when you need their help.

(c) A small token of appreciation

ITC often sent t-shirts to supporters as a small token of appreciation. If the supporter wore the t-shirt then it was also good advertising.

C. DECISION-MAKERS

It is essential that the decision-makers, the people who will influence the future of the project, see it in operation. These people include government, funding sources, commercial service providers, etc. It is important to plan a V.I.P. (Very Important Person) demonstration with great care. Projects advise against having a 'Grand Opening' the first day of operation with V.I.P.'s present because the system is so new that things will inevitably go wrong. ITC had a 'special opening' on the first official day of programming but it was restricted to the community V.I.P.'s. The grand opening for the decision-makers was held two months later when the bugs had been worked out of the system.

The IITV Project found that videotapes of the speeches made by the decision-makers during their opening broadcast provided an important record of commitments and a valuable tool for future negotiatons. (Robertson #14)

It is also important to keep the commercial satellite service providers aware of your long-term operational needs for satellite facilities. This should be done through a process of on-going consultation.

D. SPONSORING ORGANIZATION

It is important to keep the project profile high within the sponsoring organization. Channels of communication should be estblished with senior management and board members and regular briefings should be held. (House #4) Live demonstrations and videotape screenings were found by the ITC Project to be effective methods for involving the parent oganization.

VI PROGRAMMING

A. PROGRAMMING PROCEDURES

1. Establish a long lead time

Program production is time-consuming and requires careful planning if it is to meet audience needs. Many projects found their lead time for program production to be inadequate. The IITV Project, for example, received protests from the participants because of the short lead time available for program planning and organization. "At the originating site, instructors, administrators and technical staff require more time than was allowed in the IITV Project to prepare course descriptons, publish and distribute brochures, assemble student materials, and reallocate human resources. Receiving sites similarly need more time to survey and confirm community education needs, advertise courses, and allocate physical facilities, staff, and funds." (2, p. 31)

2. Develop programming in consultation with the audience/users

The degree of audience or user participation in program production varies with each project and ranges from turning over responsibility for program production to the audience to the solicitation of their programming ideas. In general, the more consultation, the more successful the programming. "The more you know what the audience wants and the more they are involved, the better off you are." (Robertson #14)

In tele-education projects there is usually an additional level of consultation required with other teaching institutions. The IITV evaluaton concluded that there must be a systematic procedure for gathering, analyzing and responding to program suggestions from the participating colleges and other institutions. (2, p. 32).

3. Produce programming for specific conditions

In general, projects have found that it is difficult to take pre-packaged educational material from other sources and utilize it 'as is' without some form of modification to suit local conditions. This means that most projects, even if they plan to rely on already available programming sources, will have some production requirements. (19, p.6)

4. Consider a multi-disciplinary production team

Tele-education projects have found multi-disciplinary teams effective for program production. The team might include a content specialist, production staff (scriptwriter, producer/director) and an evaluator. The ATS-6 case study found that with this approach, "the content people learn to take production factors into account and the production people become committed to the educational goals of the project". They concluded that this approach is much more successful than one that separates the functions either in time, in space, or in organizational units. (10, p. 59)

5. Project objectives must take priority

The production staff must have a clear understanding of project objectives and must allow them to take precedence over production considerations. The ATS-6 case study found that the opposite priorities prevailed in most of the projects that they observed. "The production groups seem to value professional 'polish' and their goal prevailed in light of the educators' unclear goals... Only a clear statement of goals and an explicit ordering of priorities that is shared by the entire staff can rectify the situation." (10, p. 60).

6. Consider pre-testing

Tele-education projects recommend pre-testing programming with the intended audience to determine whether the desired learning is taking place. It is equally useful to pre-test community-directed programming for example, in a community hall setting, to assess its reception. (Feaver #2)

Some projects which have not had the time or resources to pre-test programming have circulated scripts or preview tapes to educators. The ATS-6 case study concluded that these methods cannot substitute for pre-testing with the intended audience. (10, p. 61)

7. Establish procedures for quality control

Program production is often decentralized to some degree and, for this reason, it is essential to establish procedures for quality control of programming, from both a technical and a content perspective. Guidelines should be sent out in advance to program producers stating program length limitations, how to prepare effective visual aids; eg. the format, size and recommended colours. Information should be provided on where the ultimate authority for program approval lies.

The STEP Project found this problem to be complex and concluded that the optimum balance between centralized vs. regional control of programming remained unresolved and the mechanism for achieving a balance was unclear. Some local programmers complained of interference from management. On the other hand, some programmers refused to modify programming on the basis of audience evaluation/feedback. (22, p. 21) Responsiveness to user feedback can be made a mandatory condition of project participation but it is difficult to enforce. Whatever the procedure established, be sure to establish production deadlines that allow adequate time for pre-screening of the program by the designated quality control agent.

8. Have back-up programming and contingency plans

Inevitably programs have to be cancelled, sometimes for technical reasons and sometimes for a variety of situations, usually unpredictable. Some of the situations that forced the cancellation of ITC programming were bad weather that prevented people from reaching the satellite meeting rooms, local elections, a funeral in the community that organized the program. See page 95 for the procedure that ITC followed when there were technical problems.

9. Don't fill the programming schedule

When drawing up programming schedules, prior to the operational phase it is essential to leave some free time in the schedule to permit scheduling flexibility. Flexibility allows for the re-scheduling of cancelled programs, the introduction of spontaneously developing program ideas and short-notice use such as seminars.

10. Set aside schedule time for administration

Set aside schedule time for project administration. It can include a few minutes before each broadcast for general housekeeping as well as dedicated blocks of time for staff meetings. The IITV Project used the satellite for administrative discussions twice a week and the project manager felt that it was one of the best things that they ever decided to do. "The need to talk to your counterpart is constant, to plan together and to sort out problems together. We developed a feeling of teamwork that wouldn't have happened if we had to rely on face-to-face meetings every two to three months". (Robertson #14)

Hermes evaluators recommend that at least 10% of satellite time be reserved for project administration. (11, p. 12) ITC set aside one afternoon per week for a staff meeting which represented approximately 15% of total satellite time.

11. Provide training for participants

It is important to establish a training procedure for program participants. The training should include the following:

(a) A program run-down outlining how the program will proceed using an agenda or program outline. Teleconferencing procedures should be explained including methods of interaction, tips for communicating well, etc.

(b) Information on how to operate the equipment, the microphones, the fascimile, etc. Participants may need some time to adapt to the technology, particularly if they are using visual aids, a blackboard, etc.

(c) Standard means of communicating with the control room and with other sites including procedures to follow in the event of technical problems, e.g., set of hand gestures, notices on screen, etc.

(d) Briefing on local conditions: background of audience or users at other locations, interests, environment.

(e) Briefing on broadcasting law and regulations if program is being rebroadcast locally, including information on libel and slander, CRTC regulations, etc.

(f) A more detailed training program is required for tele-education instructors to enable them to teach effectively at a distance. The IITV Project recommends that instructors be trained in instructional techniques, in the development of student interaction and in other uses of video as a learning aid. (2, p. 32)

12. Provide practice sessions

In general, if the program is to be a complicated one, the users should be given a rehearsal in the studio to allow them to work out the bugs and be more at ease for the 'on-air' program.

Memorial University established a microwave link to enable telemedicine instructors to carry out simulations (practice sessions) on alternate days during the satellite broadcast period. Audience interaction was simulated by project staff if an audience could not be arranged. It was felt that the simulations resulted in better programs because the course leaders were able to overcome their apprehensions about the technology, adjust their normal presentation to the demands of television and become used to the interaction. (15, p. 24) Reservations about the merit of simulation were that many course leaders did not feel it was necessary and/or had no time to schedule it, it increased the staff workload and it was difficult to obtain an audience because of short notice and odd hours. (15, pp. 32, 33)

On the other hand, the Quebec Telehealth Project found that practice sessions only increased some users' apprehensions about the technology. The co-ordinator found that if people used the equipment without any advance preparation they tended to be less self-conscious and more at ease with the system. (Page #12) This difference in experience is no doubt related to the complexity of the task required of the user. ITC found that complex programs with a combination of graphics, slides, video segments or in-studio demonstrations required a prior run-through, if not a complete practice session, if only for the studio director to get a clear understanding of the user's needs.

13. Prepare program run-downs

Program run-downs which outline the programming format should be drawn up well in advance of 'on-air' time. In a teleconference this can be an agenda, a lesson plan or a simple statement of how the meeting will proceed. For a broadcasting production a 'run-down' gives a breakdown, on a minute-by-minute basis of the audio and video requirements. It allows the director to determine what cameras will be needed, in what position, what pre-taped audio and video should be cued and what graphics set up.

14. Consider methods for programming support

Tele-education projects have concluded that the satellite programming should be supported by other educational techniques. The STEP Project found that "satellite delivery seems to work best when it is part of a multi-modal system, utilizing tutors at the receiving ends, workshops or discussions, print materials, etc." (6, p. 141) The ATS-6 case study suggests guidelines for determining the need for a tutor or on-site instructor. "The need for having a local expert is greater when the audience at the site is larger, when the goals of the program are more explicitly educational, when the audience is less motivated, when the subject matter is more general, when the educational level is lower, and when the audience is younger." (10, p. 30) For example, in classroom situations in primary school the need for a local teacher is obvious. In small classes of medical students there may be little or no need for an on-site instructor. (10, p. 47)

15. Establish procedures for preparing and distributing program support material

Written material provided to support the satellite programming, may vary in length from a one page agenda to pages of detailed course material. A procedure must be established for preparing the material, duplicating and sending it out to the participants prior to the broadcast and confirming its delivery. Many projects suffer from delays in the delivery of program support material, resulting in frustration for the participants. Facsimile is an excellent method of delivery but if the material is lengthy, transmission is time-consuming and, if you're paying for the line, costly. Most projects use mail or courier service for lengthy material but most complain about slow delivery. One important factor in the timely delivery of support material is the setting of early deadlines for the preparation of material.

Recognize that the more diverse your programming, the more varied your local audiences and the more complex and time-consuming the preparation and distribution of supplementary program material.

16. Provide for on-site co-ordination

A co-ordinator should be appointed at each site to assume responsibility for unlocking the door and setting up the equipment before the scheduled satellite time and demonstrating the system to the participants. Other site co-ordination duties include keeping the equipment in operating order, publicizing the programming and doing evaluation duties The IITV Project found that other site co-ordination activities required in a tele-education project include classroom scheduling, assembly of student records materials, supervision of classroom leaders, attendance keeping, distributing student handouts, proctoring examinations and advising students of cancelled classes. (2, p. 29)

17. Don't be too ambitious

Don't be overly ambitious in your programming plans. The production of software, particularly video software requires more time and effort than many planners expect. In making programming commitments keep in mind the extensive amount of pre-planning, co-ordination and resources required for each programming hour. The ATS-6 case study found that literally all projects reported that they underestimated the amount of effort and lead time required for software production. This was the case, even though the project's had anticipated that production would be a major part of their activity and had committed the lion's share of their budgets and staff to the task. (10, p. 59).

Memorial University, for example, concluded that their project had crammed too many hours into too few weeks and made unreasonable demands on both the audiences and the resource people. "Everyone made an exceptional effort to cope with the resulting pressures because the Project was understood to be unique, but it is clear that any future Project would have to spread the programmes out much more as no one would be willing to make such efforts a second time." (15, p. 36). (See section on Some Early Decisions-Satellite Schedule, p. 22, for further discussion of this point.)

18. Set up procedures for tape editing, duplication and distribution

The project will produce hours of videotapes or audiotapes of programming and a procedure must be established for their use. Set up criteria to determine which tapes will be wiped, which stored for archival purposes and which edited for distribution. A numbering, labelling and cataloguing procedure will have to be set up to keep track of the tapes. In considering further distribution remember that editing hours of tape is time-consuming and requires the allocation of staff and equipment.

If the tapes are to be distributed, keep the distribution system in mind when deciding on duplication equipment; (i.e. Don't duplicate on ½" video equipment if all the schools have 3/4" playback equipment). The recording system will have to be designed to ensure that audio from all sources, remote locations, studio microphones, pre-taped video segments, etc., is recorded on the master. The duplication of tapes requires a system of quality control. Operator errors, such as recording at levels which are too high or too low, failure to record the audio track, starting the recording late, etc, are common. (20, p. 31)

19 Know the laws and regulations

Make sure that the project is aware of and has complied with all the relevant Canadian Radio-television and Telecommunications Commission regulations, the Department of Communications regulations, the copyright laws, etc. For example, there may be requirements to keep copies of programming for a specified period of time and/or to maintain programming logs.

B. PROGRAMMING CONTENT

1. Maximize use of interactive capacity

If a project has an interactive (two-way) capacity then its use should be maximized. Audience frustration resulted in all projects when not enough time was allocated to the interactive portions of the program. This is not to advocate the inclusion of an interactive capability in all projects. That decision is dependent on the project's objectives. But rather to say that, if it is there, it should be fully exploited.

2. <u>Involve the remote sites</u>

One of the findings from the Hermes and Anik-B projects was that programming should stimulate communication among remote sites, not just between the remote sites and the central transmit location. "In general, participants at remote sites reacted favourably when presentations were made by resource people at other remote sites, not exclusively by those at the main resource center." (8, p. 5)

3. <u>Control the video</u>

Although the interactive capacity should be maximized, the video capabilities should be controlled. In general, the video should only be used if it reinforces and compliments the audio. It must not detract from the content of the audio. Scientific studies have shown that "for nearly all purposes a video signal does not add anything to the efficiency of interaction via audio". (23, p. 129) For example, ITC found that when a program originated in an audio-only community, in general, the video should be turned off or left up with a graphic display. It is impossible to co-ordinate the broadcast of relevant slides and graphic displays during the teleconference unless the visuals have been selected by the program originator in advance, the chairman requests the specific visual during the teleconference and it is on for a reasonable length of time. Any other use of the video tends to be distracting and confusing.

4. <u>Introduce the program</u>

The program topic and objectives should be explained to the audience at the beginning of interactive programs. Any instructions regarding procedures for questions, remote community interaction, etc. should be explained at this point. At the same time each site should indicate the size and nature of the audience and a brief introduction of who is present. This information can prevent potential embarrassment and improve communication.

5. Consider the use of a moderator

Some projects use a moderator(s) throughout the broadcast phase to provide continuity to the programming series and to establish a rapport with the remote sites. The moderator can play an important role in stimulating interaction and breaking down the formality of the technical system. The Telehealth Team concluded that in some cases, it was more effective to use a peer group moderator rather than a professional moderator (28, p. 56).

The IITV Project found that a moderator is useful if there are a large number of different resource people appearing on the program but if the programming already has continuity of staff (i.e. the same course instructor for every class) then a moderator is not required. (Robertson #14)

6. Consider the use of local animators/facilitators

The use of local animators or facilitators who are familiar with the programming content should be considered, in order to encourage discussion from the remote sites and to promote interaction. The co-ordinator of the Quebec Telehealth Project sat in on sessions at the remote site and found that asking questions herself helped the users to overcome their inhibitions about the technology. (Pagé #12)

7. Ensure that on-air people are communicators

On-air people should be selected for their communicating skills and their expertise in the field. Use of the technical apparatus can be quickly learned. An evaluator concluded that "It seemed most important that the educator should be competent as an educator, rather than technically competent. It thus became easier to forget technique and to interact using the medium". (16, p.58)

VII TRAINING

A. ESTABLISHING TRAINING PROGRAMS

On-going training programs must be incorporated into the project's implementation. The required amount of training will vary with the project but, at minimum, both the staff and the users or target audience must be trained to use the technology. Some projects will have broader training ambitions. ITC, for example, had the goal of training Inuit as film-makers and video-producers. The project also adopted a principle of employing local people wherever possible. This meant that resources for an extensive and multi-faceted training program had to be incorporated into the project design.

Although the kinds of training involved in a project like this are extremely varied and job-specific there are some general principles of training that can be established.

1. Training must start early

   Training must begin at the earliest opportunity. The first thing that ITC did after receiving its funding approval was begin a training program for the program producers. This was nearly two years before the official opening of the satellite network.

2. Training programs need to be tailor-made

   ITC found a variety of individualized, short-term and on-the-job training programs to be the most effective way of training program staff. There was no existing institution or pre-packaged training program that met the training requirements of the project and ITC designed a training program to meet the specific needs of the project.

3. Design training programs with care

   All training programs have to be carefully designed and take into account factors such as; the trainer to trainee ratio for the given program, the availability of the necessary equipment, facilities and trainee housing, weather conditions, the length of time required for film processing, the skill level of trainees, how realistic training goals are for the given time frame, etc.

4. <u>Specify training goals</u>

Training goals and objectives must be fully understood and agreed to by all participants (both trainer and trainees) before training begins. Trainers recommend drawing up a list of specific skills that should be acquired during the training program and checking off skills as attained. This provides a tangible and consistent measure of progress for both the trainer and trainee. (Feaver #2)

5. <u>Provide family contact</u>

If lengthy training programs are to attract older staff with family responsibilities, they must be held in the trainee's community or some arrangements made to provide the staff with family contact; (eg., Arranging for the family to visit the training location, flying the staff member home, etc.).

6. <u>Train the trainers</u>

Trainers needs to be trained. In order to minimize adjustment time, trainers need to be well briefed about the background and local working conditions of the trainees. Because of the time-consuming nature of training the trainers, it is extremely desirable to develop a pool of trainers that are familiar with the project and the staff and that can be called on as needs arise.

7. <u>Provide follow-up support</u>

Training programs must be followed up with close supervision and adequate support systems.

B. TRAINING COMMUNITY CO-ORDINATORS

The training of the field staff is particularly important because they are the crucial link between the user and the system. They must couple technical knowledge of the system with an ability to assist users to realize the technology's potential. Certain field work 'facilitation' tasks are common to most project. "Seeing to it that the equipment is functioning at the appropriate times; instructing others in the use of the equipment; distributing public information about the programs and schedules and getting people to attend; building relations with local groups or figures to ensure local approval for the project; and providing feedback and reports to the project managers about the acceptance of the programs, the functioning of the equipment and suggestions for changes." (10, p. 48)

The ATS-6 case study found evidence for the importance of the field staff role. "The projects' management reported that they felt that a good deal of the differences between their more and less successful sites were attributable to the job done by the field personnel." (10, p. 48)

In the case of the ITC project the fieldstaff who performed these functions were called community co-ordinators and the following provides examples of the different types of training they received.

1. Training workshop including simulation system

   Four months prior to start-up ITC held a training workshop in the North at which a simulation satellite system was set up linking two rooms with one-way video and two-way audio, based on the system design of the satellite network to be installed. Staff held mock meetings over the 'system' and these meetings were taped for staff evaluation. Based on this experience the staff was able to draw up guidelines for users and operating principles that would maximize the effectiveness of the system.

2. On-site training

   Staff were trained on-site by a technical supervisor who travelled from community to community. He provided system checklists and equipment manuals for the staff.

3. Trained staff train others

   Once a community co-ordinator had been trained he/she then passed that training on to other staff and community users. ITC found this method particularly valuable when a staff member changed jobs and trained his replacement before assuming the new position. This approach is a common one in the projects. As the Telehealth Team explains, "While a first rate engineer is necessary to adequately study the needs of the system and design, its implementation and the necessary training of its users may be undertaken by a peer of the users". (28, p. 31)

4. Practice time on the actual system

ITC reserved the first few weeks of satellite time for the training of staff, the 'debugging' of the system and introducing the system to the users. The length of practice time will vary with the skill level of the participants but some warm-up period is essential. Projects are in agreement that it is impossible to totally prepare staff or users without the hands-on experience of real operating time.

During ITC's practice period all staff were brought into the video uplink location. This gave them an understanding of the operation of the uplink and the studio and an appreciation of what would happen to their locally-produced tapes. Once official broadcast time began there proved to be litle time for this kind of visit.

5. Training tapes

Videotapes were used as training tools. One videotape was produced by the project to show the operation and care of the videotape player/recorder. Other videotapes with sample programming from other satellite projects were used at the workshops and by the staff in their community work.

C. TRAINING PROGRAM PRODUCERS

In projects that are based on community-oriented programming there will often be one and two person teams working by themselves on community production. In the case of the ITC Project these teams, using 3/4" portable equipment were expected to research, shoot and prepare the editing rundown for complete videotape programs. In most cases the staff had no previous experience in film-making or video production. The training that must be provided to staff in this position is extensive and wide-ranging. The obvious training needs tend to focus on equipment - how to use the camera, set-up lights, edit tape, get high quality sound. There are many other skills, some quite mundane but important that have to be acquired by local production teams. Here are some of them.

(a) Script-writing, storyboard preparation;
(b) Interviewing techniques;
(c) Planning a shooting schedule;

(d) Storing equipment, wires, cables, microphones, etc.;
(e) Packing for an on-location shoot (How to make sure that nothing is forgotten);
(f) Ordering supplies (How to recognize when stock is low and order in sufficient quantities that you won't run out);
(g) Equipment handling (Instruction on tender, loving care of equipment to extend its life expectancy);
(h) Equipment maintenance (Even basic instruction on how to keep equipment clean will reduce repair rates);
(i) Equipment repair trouble-shooting (How to distinguish a minor problem resulting from something like a weak battery from a major problem requiring factory repair); and
(j) Logging, storage and filing of tapes, films, photographs, graphics.

VIII SYSTEM DESIGN

A. SYSTEM DESIGN PROCESS

System design is the process whereby the technical needs of the project are specified. It is accomplished by means of schematics on paper which plot the signal course and it defines the equipment needs. Before approaching the system design, most of the work set out in the Planning section must be completed. The duration of the project, the target audience and the number of ground stations should be known. The locations and their transmitter capability (i.e. video-audio) should be specified, the programming originators identified and the schedule set. The programming format and method of audience participation should have been determined. The following factors must be taken into account in translating these project specifications into a system design.

1. System design must be based on needs assessment, project goals and available technology

All members of the planning team must be involved in the system design to ensure that it reflects the needs of the audience, meets the project goals and accommodates the available technology. The process should be interactive with the engineer working hand-in-hand with the other team members, to come up with the optimum design. For example, in the Moose Factory Telemedicine Project, late funding, budget restrictions and short lead time resulted in the technical consultants designing the system without adequate input from the users. As a result, "some fundamental medical priorities and needs were laid aside". (4, p. 8)

The system design process is one of trade-offs. For example, unless your funds are unlimited, for every increase in system flexibility, you may sacrifice some signal quality and ease of operation.

2. Translate needs assessment into communications requirements

The needs assessment and project goals must be further translated into communications requirements to give further specification to the systems design. The following were ITC's communications requirements.

(a) To hold meetings among small groups in six communities with approximately six people participating in each community;

(b) To hold community meetings among six communities with participants congregating in a community hall or school gym;

(c) To hold educational classes for children or adults; and

(d) To transmit one-way broadcasting into people's homes.

3. Translate communications requirements into technical criteria

The communications requirements must be further translated into technical criteria that the system must meet. The following are some of the basic criteria that the ITC system had to meet.

(a) One-way video-two way audio teleconferencing;

(b) Straight two way audio conferencing without video;

(c) Tele-educational activities permitting real time response to video presentations;

(d) Community interaction among all locations involved;

(e) Telephone handset signalling and voice service among communities and between the satellite provider and communities;

(f) Provision for facsimile transmission and reception;

(g) Voice input from both open microphones and press-to-talk microphones;

(h) Video input at the video transmit location from live cameras and from pre-taped programs;

(i) Provision for graphics display; and

(j) Incorporation of a signalling device that would assist the control and organization of the teleconferencing and the tele-education. (24, p.3)

4. Establish principles of system design

The planning team should agree on certain principles of system design. This will be of assistance when it comes to resolving contentious issues. Here are examples of the principles established by ITC.

(a) Expenditure was to be minimized on items that had no use beyond the life of the project. The goal was to maximize the resources that went into hardware which had an on-going community use and into training;

(b) Where required, resources were to be allocated to the modification of equipment for conversion to on-going community use. For example, the Anik-B satellite required a 4-wire microphone system whereas the commercial telephone system uses 2-wire equipment. The project allocated resources to testing out modification of the microphone system so that it could have both 2-wire and 4-wire capacity and allow for on-going community use; and

(c) The system should aim for maximum flexibility in order to try out a range of satellite uses. If necessary, transmission quality would be sacrificed to a limited degree in order to ensure a flexible system.

5. Know the satellite technical capacity and limitations

A member of the planning team must have a thorough knowledge of the technical capacity and limitations of the satellite system. This requires that the system provider furnish the users, at the earliest opportunity, with complete technical details. For example, with the ANIK-B satellite, users were provided with only one audio channel. This meant, for example, that it was impossible to transmit facsimile at the same time as carrying out a teleconference. If aspects of the satellite capacity such as this are not thoroughly understood a system may be designed that is incompatible with the available satellite facilities.

6. Review the satellite design with the provider of the facilities

It is essential to review the draft system design with the providers of the satellite facilities. At this stage potential areas of incompatibility can be discovered and aspects requiring more work can be identified. The exchange and joint elaboration of ideas should be on-going. This consultation can avoid costly and time-consuming mistakes.

7. Visit operational projects

One visit to an operational project is worth dozens of research reports. Try to visit projects that are using the same satellite technology and that have similar project objectives. But keep in mind that your project needs may require different solutions.

8. Get second opinions

Have your system design and equipment choices checked out by other users. Benefit from other people's experience.

9. Consider setting up a simulation

Some projects set up a method of simulating the satellite network in advance of the project in order to test out the system design and the user equipment. Equipment can be tested, missing elements identified and operating difficulties adjusted. A simulation will serve the additional purposes of training the technical staff and familiarizing the users with the technology. For tips on how to design a simulation see Stolovitch (#26). This report recommends that simulation techniques be used at the planning, testing and just-prior-to-transmission stage of the project. (26, p. 57)

B. SYSTEM DESIGN FACTORS

The following factors should be taken into account in system design.

1. Symmetry

The degree of symmetry desired in the system should be determined. A symmetrical system is one in which the communications capability at each location is equivalent. The ITC system with video transmit capability at one location and audio transmit only at the other locations was an assymetrical system and ITC used various techniques to increase the symmetry of the system. The five audio-only communities were provided with videotape production capability and a procedure for transmitting their programs from the video transmit site.

Slides and photos were also gathered from the audio-only communities and transmitted. In addition, the system was designed in order that, in a live broadcast, the program could be chaired from an audio-only community with the video use being limited, thereby increasing the symmetry of the system.

A symmetrical system, however, is not necessarily a project requirement. The Telehealth Team concluded that, in some cases, duplex (two-way) television was detrimental to the programming because students were uncomfortable with it. "They did not wish to be 'on camera', especially in the question and answer period." (28, p. 19). Some projects report certain benefits from the lack of symmetry. The Ironstar Project concluded that people in the audio-only communities felt more confident about expressing their concerns to government officials because the officials could not see and identify them. (17, p. 7)

2. Flexibility

The need for flexibility in the system is determined by several factors including the number of different needs the system has to meet and the number of locations in each community that have to be served. ITC's project was designed to test out teleconferencing, tele-education and broadcasting, each with very different operating requirements and hence requiring a great deal of system flexibility.

3. Transparency

Transparency refers to the ease with which the user can adapt to the technology. An important factor in the degree of transparency required is the number of different users the system will have and their level of expertise. If the project has a succession of one-time users the system will have to be more transparent than if it relies on a few regulars. In all cases, the equipment must be sufficiently transparent that it does not discourage on-going system use. One interesting finding is that it is often the inexperienced user that adapts more quickly to the technology than the sophisticated user.

Transparency of a system is affected by the quality of the transmission. For example, the Moose Factory Telemedicine Project reported that medical consultation was interfered with by inept camera work and annoying background noise. (4, p. 86)

4. Quality

The sound and image transmitted by the system must be of high enough quality to satisfy the user. Determining that level is not an easy matter and is always a contentious issue in system design. The level of quality is a question of financial resources and, to a certain extent, the desired flexibility of the system. In tele-education projects there is a consensus that high quality audio is a more important determinant of user satisfaction than video quality. This generalization, like all others, suffers from over-simplification. If your project is broadcasting into people's homes and attempting to attract an audience to switch from other channels then the video transmission quality as well as the audio, will have to be competitive. In telemedicine projects, as well, the video can be extremely important if what is being transmitted are x-rays or microscope images.

5. Formalization

Formalization of the system refers to the extent to which the communications flow is structured and controlled. Some degree of formalization is inherent in the technology itself and some uses to which the technology is put are more formalized by their nature than others. For example, the communication between teacher and student and doctor and patient is more formalized by nature than a discussion among peers. The consensus is that there should be as little additional formalization of the system as possible. For example, it is recommended that, in general, group leaders should not act as gate-keepers, controlling the flow of information from their site to the system. (17, p. 18)

Some projects use signalling devices to assist in the orderly flow of communications. These devices are used to alert the chairman/teacher, etc. to questions, comments coming from identified sites; the equivalent of raising one's hand. ITC originally felt that a signalling device was a requirement but could not locate one that met the operating standards for the right price and decided to proceed without one. By the project's end it was concluded that the system performed adequately without the signaling device and, in fact, it probably would have received limited use. Participation was successfully controlled by the meeting chairman who would establish a protocol at the beginning of the program. In general, if all six communities were participating, the chairman would ask each commmunity in turn for their input and spontaneous interruption was accommodated but not encouraged.

Memorial University, however, used a signalling device and found it to be very useful in promoting interaction. The conclusion was that without it, the remote sites would not have been easily able to interrupt with a question. (15, p. 32) The need for a better cueing system was also an issue in the STEP Project where evaluation identified the need for "a cueing system to allow identification and controlled access from particular local sites." (22, p. 10)

6. <u>Add-on capability</u>

The system design must be designed to have add-on capability. No matter how much pre-planning is put into the system design there will be needs that are not met or unforeseen demands that will be made on the system. Some of these demands can result from the success of the project, in the case, for example, where an unserved segment of the population wants to participate. ITC, for example, installed an additional TV transmitter in response to the demands of an unserved community and added audio transmit capability to a local school.

7. <u>Potential for upgrading</u>

Most projects face budget restrictions and are required to design a system that has the potential to be upgraded (incorporate equipment of higher quality or greater flexibility) as funds permit. The IITV Project, for example, faced with a capital budget that did not allow top quality for all equipment made the decision to provide a professional broadcast base as the heart of the television system and cut back on camera quality, "The industrial quality television cameras would be replaced by cameras of broadcast standard should more capital be made available in the next budget years". (1, p.22)

8. <u>Durability</u>

The system must be durable enough to last for at least the length of the project, and longer, if a follow-up project is being considered or if on going community use is assumed. It is important to dedicate sufficient resources and test time to those aspects of the system which will be submitted to rugged operating conditions.

ITC, for example should have spent more time in developing a strong antenna structure to support the TV antennas. One of the support structures blew down in a storm and others were damaged by the local wind conditions. Repairing these structures in the Arctic cold was difficult, costly and time-consuming and, in retrospect, more development, test time and consultation with the Department of Communications should have been put into this item.

9. Reliability

In general, users expect a high degree of reliability from the system and effort should be made to ensure the highest reliability possible through equipment selection and high redundancy. (See #10 following) Research has shown that when users are not provided with a reliable system their reactions will "vary in relation to: their expectations (eg. physicians are less tolerant of equipment breakdowns than para-professionals); degree of needs; whether use is voluntary; and other positive aspects of the experience; (eg. whether they enjoy using the system)." (13, p. 65)

10. Redundancy

Redundancy refers to the extent of the system's back-up communications facilities which can be brought into play if the primary system fails. In determining the degree of redundancy required it is important to set priorities on those elements of the system which must have maximum reliability and others which are of secondary importance. For example, if a portion of the system breaks down, can the project carry-on without it until repairs are made or is it a key element that will have to be re-activated immediately. In general, it is important to have as much redundancy as possible and an adequate supply of back-up equipment, spare parts and contingency plans.

11. System support

Another aspect of redundancy is system support. There are a variety of communications methods that projects use to support the system when technical problems arise. Here are some examples.

(a) The installation of a back-up commercial telephone in the satellite room to communicate with satellite headquarters when satellite equipment fails. This telephone should be installed close enough to the satellite equipment that meters can be read and adjustments made while receiving instructions over the phone.

(b) If facsimile is to be used, a separate voice connection should be installed in order to monitor the facsimile transmission and correct problems as soon as they occur.

(c) A character generator can be extremely useful for giving instructions in the event of loss of audio. It can also be used to pass along messages without interrupting the broadcast, e.g. to alert users to the end of transmission time.

(d) Intercoms can facilitate communications. For example, Memorial University used an intercom to connect the trailer housing the satellite uplink equipment with the broadcast studio control room. The intercom was used in the pre-broadcast technical checks and during broadcasting for situations such as loss of signal. (15, p. 31)

(e) In the University of Quebec experiment telephone contact by landline was often maintained throughout satellite sessions to ensure efficient and unobtrusive communication between site co-ordinators. (11, p. 12)

(f) In isolated communities it is recommended that provision be made for a back-up communications system that can be brought into operation in the case of complete power failure in the community; eg. battery-operated HF radios. (Feaver #2)

12. Privacy

The degree of privacy required by the project should be established. There are two major considerations.

(a) The reception of your signal by other ground stations that are not a part of your project; and

(b) The ability to control the distribution of the signal among and within the project communities.

Some form of signal scrambling is usually used to try and achieve privacy from unwanted reception. This can be essential, for example, in projects that incorporate doctor/patient consultations. The Quebec Telehealth Project, however, found that securing privacy of the system was highly problematic. The audio scramblers did not work satisfactorily and the users were never totally confident that their request for privacy was being achieved technically. (Page #12)

ITC used the signal flow and switching mechanism among and within project communities to gain some control of reception. The signal transmission was modified from program to program according to user request. For example, the signal could be sent to small meeting rooms only (and not broadcast into people's homes) to allow for user privacy. The satellite signal could also be sent to specified communities allowing for the restriction of regional meetings to the appropriate communities. On the other hand, no attempt was made to prevent other non-project ground stations from picking up the ITC programming because the unfamiliarity of the broadcast language, Inuktitut, generated its own privacy.

13. <u>Capacity</u>

System capacity should be restricted to that which is demanded by the project. There is a natural tendency to want to test the satellite capacity to its limits, especially if the satellite facilities are being made available at less than cost. Keep in mind the real cost of the facilities and the long-term potential for operational or commercial use. As one observer put it, "It seems to me that the general shortcoming of experiments...is the lack of concentration on questions of economics and the relationship between the application of technology and the requirements of the situation". (16, p.56)

14. <u>Real time vs. taped</u>

What are the project's requirements for real time operation and how much can be pre-taped? One determining factor is the requirement for interaction. If the program does not require live interaction then it may be preferable to ship pre-taped material to the sites rather than using satellite transmission time. Or, if live interaction is desirable, the sites could view the pre-taped material locally and restrict the satellite use to live interaction. It has been found, for example, that teachers often prefer this technique because it allows them to fit the screening of programs to their classroom schedule and allows them to stop and start the videotape at will to develop a class's interest or clarify a confusing point. (10, p. 58)

15. Broadband vs. narrowband video

There are more limited modes of video transmission available that do not require the same extensive bandwidth that broadband video does. Depending on the project's objectives, alternatives should be considered such as narrowband video or slow scan TV. In addition, if two-way video is a requirement, simplex or reversible one-way video might be adequate with 'press-to-see' and 'image freeze' capability as possible options. Projects have had differing degrees of success with these modes of operation and research should be done into the pros and cons of the various options.

16. Video transmission facility

The degree of sophistication and flexibility required in the video transmission facility will be determined by the use. For example, the requirement for camera control will have to be determined. Will the camera work be the responsibility of cameramen or will the cameras be set up to permit control by participants? Will there be a facility for control of the cameras from other locations? A system that is used primarily for teleconferencing may require no more than one camera that can be controlled by the chairman. To meet ITC's additional needs for tele-education and broadcasting it was concluded that the multiple use required the flexibility of a manned three-camera studio with a control room that required a minimum of three staff.

The IITV Project had fixed cameras with a one-person control room. "The operator, sitting in one position, was able to reach comfortably all of the selection switches for audio and video, start and stop both video tape machines and monitor the quality of colour pictures and sound levels fed to the satellite network." (1, p. 41)

In the Moose Factory Telemedicine experiment, the satellite link between a northern hospital and a health science centre was designed so that the controls for the cameras located in the northern hospital would be controlled by the consulting doctors at the health science centre in the south. "Using the pan/tilt and zoom/focus/iris adjustments the medical consultants were able to obtain precisely the images they required." (4, p. 12)

The decision will have to be made as to whether to use monochrome or colour equipment. The Moose Factory Telemedicine experiment selected monochrome equipment "for its improved resolution and because it was easier to operate and maintain". However, a microscope that had been adapted to black and white equipment was switched over to colour. "While the resolution and colour fidelity was not excellent, the doctors found the images more useful in some ways than the high quality monochrome ones." (4, p. 12)

In video transmission rooms, where hot studio lighting is required, some mechanism must be set up to keep the temperature at a bearable level for the users. The average air conditioner is too noisy to use during broadcasts. ITC attempted to create a draft system for hot air escape but was not completely successful.

An attempt will also have to be made to reduce the noise and activity level in the video transmission room. The Moose Factory Telemedicine experiment concluded that the video transmit activities (teleconsult and teleconference) need to be physically separate from the telephone, telecopier and data transmissions because the latter "tended to be annoying and distracting to the medical consultants". (4, p. 13)

17. Audio requirements

Special attention must be paid to defining the project's audio requirements and designing the audio system, because it is the audio, not the video, which tends to give projects the most trouble. The major technical problems encountered by the Hermes experimenters, for example, were associated with the audio system. (17, p. 14)

The principles under which audio systems operate fall into two basic categories, 'open' and 'push-to-talk'. To simplify, an 'open' system is one in which the audio channels are continually open and all ground station sites can hear each other at all times. The consensus is that the 'open' system is a preferable mode of operation. Educators, for example, find that the 'open' system more naturally replicates the classroom environment. If a joke is told, people can hear the responding laughter and there isn't the impression that one is talking to 'dead air'.

The 'push-to-talk' system, as the name implies, operates on the basis that if someone wishes to speak he/she pushes down on the microphone bar. Otherwise the audio channels remain closed. The advantage of the 'push-to-talk' system is that it reduces audio feedback which can find its way into the system and reverberate through the channels creating a howling effect. 'Open' systems are vulnerable to feedback but can be carefully set up in such a way as to minimize it.

ITC opted for the 'push-to-talk' system for tele-conferencing and tele-education because the microphones were constantly being moved from location to location and being taken down and set back up. This made it difficult to adjust their placement to minimize feedback. In addition, northerners were very experienced in the use of HF and CB radios which operate on the 'push-to-talk' principle.

It is important to note that the audio levels require constant adjustment during broadcast. The need is more pronounced for the 'open' system but is present as well for the 'push-to-talk'.

18. <u>Audio transmit/receive and video receive rooms</u>

A study of 45 interactive telecommunications projects in the United States found that there are at least four major factors that have to be considered from the user's perspective when selecting the location of transmission/reception rooms.

(a) Physical distance from the users - proximity encourages usage.

(b) Whose turf the equipment is on - home turf encourages usage.

(c) Normal traffic patterns of users - locating equipment near routes travelled by users in their every day routines encourages usage.

(d) Transportation barriers - users are reluctant to pass through perceived transportation barriers, eg., stairway, elevator, building security, etc. (3, p. 1)

The project rooms in the ground station communities will have to be modified for adequate transmission/reception. Thought will have to be given to acoustics, storage cabinets and amenities such as a coffee-maker. It is important that the project rooms have an inviting atmosphere. If video reception is required there will have to be an adequate number of monitors, properly positioned or a sufficiently-large video screen.

In the selection of project rooms technical factors must also be considered, such as adequate power supply, suitable location for indoor ground station equipment, accessibility to ground station site, etc. The noise level from other activities in the building must be acceptable. Both the comfort range of the users and the temperature requirements of the equipment will have to be considered. For example, if the satellite equipment room is too small the equipment will overheat so excessively that even a fan will not adequately compensate.

Space dedicated to the project is desirable but is often not possible. Attention must be paid to not antagonizing the community or the target audience by usurping valuable space. The Telehealth Team found that, "Telehealth apparatus is not well received when it displaces "bread and butter" space requirements". (28, p. 31)

See Site Selection Criteria p. 86 for further discussion of some of these issues.

19. <u>Power requirements</u>

The power requirements of the satellite ground stations and the project equipment must be determined. In the case of Anik-B, for example, the video transmit ground station used by ITC required 2 kilowatts of power, whereas the video receive/audio transmit ground stations could be fed from a standard single phase supply.

The stability of the power source will have to be assessed. A voltage meter will measure the voltage fluctuation but frequency stability is not as simple a matter to assess. In order to guage stability ITC operated video equipment on site and evaluated its performance. It was found necessary to install a voltage regulator and a frequency stabilizer in one location where videotape editing was being carried out.

The Naalakvik II Project installed its own diesel generator to power a television studio in a remote community but had to discontinue its use because the power feed was not stable enough for the editing unit. In addition, too much power built up in the generator and blew out fuses in the television sets. The studio was subsequently hooked up to the community power system which proved to be more stable. (27, p 20)

20. Other systems

Other communications systems, already functioning in the community, should be taken into account in the system design. For example, it is essential when selecting the operating channel for the local rebroadcast transmitter to consider other services that may be utilizing portions of the broadcast spectrum. A pirate TV station was in operation in one ITC community and video playback machines were in homes in several communities.

C. EQUIPMENT SELECTION

When deciding upon specific equipment the following factors should be taken into account.

1. Portability

The requirement for portability will vary with the project . In ITC's case different rooms were used depending on the size of the meeting and, in addition, the rooms usually had multiple use that required that project equipment be put away after use. As a result, the equipment had to be portable, easy to pack up, store and re-install. All this had to be accomplished with low probability of failure due to damage or improper installation.

2. Durability

The requirement for durability is a complement of the portability requirement. Other factors affecting the degree of durability required are: the number of different new users of the equipment, their degree of familiarity with the equipment and whether there will be children using the equipment. Off-the-shelf equipment will sometimes have to be modified to increase its durability. ITC, for example, had to replace the cords on the teleconferencing microphones with thicker and sturdier cable, better able to withstand rugged use.

3. Reliability

What are the performance and maintenance records of the equipment? This can often only be determined by locating other users who will give you an evaluation or by buying a sample on condition in order to test out performance. A cautionary note is that second-hand equipment should not be rejected out of hand but its reliability is reduced and it can sometimes cause more trouble than it is worth. (For further discussion see Financial Administration p. 28)

4. Cost-effectiveness

One approach that should be considered when evaluating equipment on durability, reliability and price is whether it would be more cost-effective to treat it as a 'throw-away' item. Depending on the project objectives, it sometimes makes more sense to buy an inexpensive and common place piece of equipment, which can be thrown out in case of failure, rather than purchasing a very expensive piece of equipment that requires costly and time-consuming repair. (Feaver #2)

5. Ease of maintenance and repair

How much maintenance and repair can be done on the equipment in the field? What is the potential for developing a local repair and maintenance capability for the equipment? Are spare parts readily available? This is particularly important if the equipment model has been discontinued. Can repairs only be done by the supplier and where are they located? If equipment has to be sent out to be repaired or maintained what is the turn around time? Answers to these questions should be obtained as part of the equipment comparison and buying process.

A Telemedicine project operating in Northwestern Ontario estimated that it took three months turn around time for slow scan equipment to be repaired in Colorado, with the major problem being customs delay. (12, p. 53) ITC ran into similar difficulties with teleconference microphones, purchased from an American company. The company would not provide the schematics for the equipment which meant that it had to be returned to them for repair. There was time lost and extra costs incurred in the shipping coupled with customs delays and charges.

6. Compatibility

Care must be taken to ensure that equipment is compatible with other project equipment operating in the system and also with other equipment operating in the communities. For example, ITC looked into buying facsimile equipment that was compatible with that already operating in the municipal offices, in order to expand the network and provide back-up for both systems. Unfortunately the make of equipment used by the municipality was of inadequate quality for the satellite network and incompatible equipment had to be purchased.

7. Redundancy

The requirement for redundancy, i.e. back-up units, can limit equipment options. ITC decided to restrict purchases to one make of video equipment because any new unit provided redundancy to those already owned by the project and was completely interchangeable, one with the other.

8. Operating conditions

Examine equipment in the light of the conditions within which it will be operating; eg., temperature variations, dust, power fluctuations, rugged treatment, etc. New equipment, which has not been used under operating conditions should be tested on site before the complete order is placed. Sometimes equipment which performs well in the lab does not work in the field. And, occasionally, equipment which engineers conclude will not work in the field, will, in fact do the job that is required. Only field tests will provide the final answer. (Feaver #2)

9. Matching equipment to user needs

Care must be taken to match equipment characteristics to user needs and situational constraints. A study of 45 interactive telecommunications projects in the United States found some examples of things that can go wrong if this is not taken into account: a remote control zoom lens was too slow for a crisis situation in a hospital setting; the wrong microphones were selected for a situation where there was a high level of background noise; the video monitors were too small and placed too far away for a user group which consisted of many people with poor eyesight. (13, p. 64)

10. Shipping capability

Consider whether the equipment can be broken down into modules for shipping and whether it will be able to fit through airplane cargo doors. Also consider whether the equipment is sturdy enough, if properly crated, to survive the rough handling that it will receive in shipping. ITC purchased one videoscreen, with an option on more, to first test out whether the unit would survive the ordeal of being shipped into an Arctic community and the extremes of climate. It did.

11. Technical approval

Make sure that equipment has received the required technical approval. For example, low power broadcasting transmitters have to be type approved by the Department of Communications before a Technical Construction and Operating Certificate (T.C.O.C.) can be issued.

12. Availability

What is the estimated delivery time for the equipment? Take all estimates with a grain of salt. They are usually extremely optimistic.

IX SYSTEM INSTALLATION

A. SITE SELECTION PROCEDURE

1. Make timely site selection

Make site selection well in advance of system installation and at a time when the snow is off the ground, the ground is thawed and the lay of the land is clearly visible.

2. Include full crew in selection

It is important that people with the following responsibilities be in on the site selection.

(a) Systems engineer - the engineer who is part of the planning team and responsible for the systems design.

(b) Systems installer - the person who will actually be installing the system and project equipment on site.

(c) Construction supervisor - the person responsible for project construction, including building erection, modification, etc.

(d) Ground station installer and aligner - the person responsible for installing the ground station and aligning it with the satellite.

(e) Community consultant - the person responsible for community consultation and liaison.

3. Complete the following tasks

The site selection crew should complete the following tasks at each site.

(a) Selection of ground station site.

(b) Selection or confirmation of building(s) for local transmission/reception.

(c) Preparation of blueprints for all construction required, including itemization of materials required, estimated labour and material costs.

(d) Identification of local availability of building material, including gravel for ground station pads and hydro poles for antenna.

(e) Determination of availability of local labour and conditions of employment.

(f) Preparation of local systems design indicating wiring routes, equipment location, location of TV antenna, etc.

(g) Itemization of all local equipment and system needs including radio relays, length of cable, required height of TV antenna, etc.

(h) Assessment of power supply, including availability at project sites and stability and reliability of supply.

(i) Identification of buildings for equipment storage both prior to installation and during the project.

(j) Agreement from local authorities for the systems plan including permission for the use of any land concerned, building permits, etc.

(k) Agreement of local organizations to assist in system installation, eg., in ITC's case the community councils provided the gravel pad, erected the hydro pole for the TV antenna, donated the use of buildings, etc.

(l) Definition of responsibility for the elements of system installation, written up as action items under the appropriate body responsible.

4. <u>Carry out advance community consultation</u>

It is essential that community consultation be carried out in advance to inform the community about the nature of the project, to obtain local permission for the project, obtain necessary permits, etc. and to request input into the building selection, system installation, local contributions, etc.

5. <u>Organize equipment</u>

The site selection team must organize the necessary equipment for the trip and draw up a checklist to make sure that nothing is left behind, eg., a device will be required to measure the elevation angle clearance of the ground station site; a voltage meter is necessary for checking the stability of the power supply, etc.

B. SITE SELECTION CRITERIA

The selected site will have to meet the following requirements.

1. Ground station location requirements

The ground station location will have to:

(a) Meet the required clearance in azimuth and elevation angles in order to provide the ground station with a clear view of the satellite.

(b) Provide a stable, flat surface that can bear the ground station weight and permit it to remain in a fixed position once installed. In most cases, a gravel pad, at minimum, will have to be laid to provide an adequate base.

(c) Meet the need for a power feed and the shelter of associated ground station equipment. For example, in the case of the Anik-B satellite, the ground station had to be within one hundred feet of a heated building, supplied with power, to shelter the equipment boxes.

2. Building requirements

The selection of buildings will have to take into account the factors discussed under systems design pp. 76-79.

The modification/construction of buildings:

(a) Will require permission from building owners with respect to conditions of use and any construction required;

(b) Will have to accommodate other, potentially conflicting uses of the buildings;

(c) Will require conformity with the National Building Code and the meeting of fire regulations; and

(d) May require the obtaining of a building permit.

3. System requirements

The entire local system:

(a) Will have to be as cost-effective as possible; eg. ITC located the ground station adjacent to one of the project meeting rooms in order to minimize the cost of cable and radio relay links.

(b) should respond to other local needs. For example, in one community ITC installed the TV transmitter and antenna in a location adjacent to the local television society to facilitate their use of the transmitter in 'off' hours.

C. PREPARATION FOR INSTALLATION

Months of lead time must be built into the system installation schedule. Everything that can go wrong, will go wrong, and a lot more. Projects have been affected by labour strikes, record-breaking blizzards, plane crashes and the death of key personnel. Delays in receiving, testing, shipping and installing equipment are inevitable. It then takes time to set the system in motion and try it out.

The Department of Communications concluded that Hermes experimenters frequently "under-estimated the time required for installing and checking out their system with the satellite before it could be handed over for programming". The result was that system users and technical installers ended up vying for satellite time and official openings were held before the system was fully in place and checked out. (17, p. 9)

This is particularly risky because if projects 'open for business' before the system is fully 'de-bugged' users will often have a bad first experience with the system. (3, p. 3) Disappointed first time users are unlikely to recommend a system to others and are less likely to return themselves. At a later stage, after some successful experience, occasional difficulties are less serious but in the early stages they may jeopardize the project. (13, p. 71)

However, it is possible to be prepared too early. In the ITC Project one of the communities had their satellite equipment room construction completed one year in advance. This room was located in the community hall and since the local committee didn't see the room being used they authorized a local coffee shop to usurp the space and tear down the structure.

It should be noted that not all projects do the complete installation themselves. The IITV Project, for example, assigned the responsibility for installing the smaller ground stations (1.8 m) to the participating colleges. The colleges were told by the project, "We want you to know how to install it, how to service it and you only find that out if we give you the equipment and some good instructions." (Robertson #14)

The following are recommendations for installation preparation.

1. <u>Go out to tender for equipment</u>

   Make it standard practice to go out to tender for equipment purchases. ITC found that it was important to send requests for quotation to suppliers in several different cities to make sure that the bidding was competitive. Of course, lowest bid should not be the sole consideration in selecting a supplier. Price should be weighed against such factors as quality, reliability, delivery performance, availability of maintenance, etc.

2. <u>Carefully select the supplier</u>

   Do some investigation to establish that the equipment supplier is reputable and reliable. It will be of considerable assistance if the supplier has had experience in the project's specific operating environment and it may be worth paying a bit more for the equipment to obtain that experience. (MacGregor #9)

3. <u>Consider renting</u>

   Consider the rental rather than the purchase of equipment. The Naalakvik II Project decided to rent television studio equipment because of greater certainty in the supplier meeting warranty commitments and providing substitute equipment as required. (27, appendix)

4. <u>Set up a procedure for follow up</u>

   Set up a procedure for follow up on all equipment orders and all action items. Follow up should be regular and persistent. For example, telephone suppliers prior to equipment delivery dates to confirm that delivery commitments will be honoured. If equipment does not arrive by arranged date be tenacious in tracking down the problems and applying pressure to expedite matters.

5. Comply with regulations

Make sure that all Department of Communications regulations have been complied with and that Technical Construction and Operating Certificates (T.C.O.C.) have been obtained, where required.

6. Prepare ground station pad

The preparation of ground station pads is not a simple matter and the drawing up of specifications should be done well in advance of installation. Depending on the ground station size and the ground conditions, concrete or rock foundations may be required and the advice of a mechanical engineer may be necessary (MacGregor #9).

Gravel pads for the ground stations should be installed ahead of time in order to let them settle. In permafrost conditions it is generally recommended that the gravel pad go through the freezing and thawing of a winter and spring before being put to use. In the ITC case, however, some pads were put in a year in advance, others one month in advance and no shifting was detected that affected the ground station antenna position. However, that may just have been luck.

The size of the gravel pad required will vary with the size of the ground station and these sizes should be carefully noted. The material associated with the gravel pad should be assembled, eg., fencing, wooden base, oil drums filled with gravel used as fence supports and as weights on the wooden base.

7. Test all equipment

All equipment must be thoroughly tested before being shipped into the ground station sites. Equipment, for example, that is designed to operate as a unit (eg. a television control room) should be pre-assembled by the supplier and tested with project staff in attendance, before being dismantled and shipped to the site.

8. Pre-test audio system

The audio system should be tested on the satellite link prior to community installation in order that adjustments may be made prior to shipment. This also provides a good test of the interface equipment. As a result of the ITC pre-test it was decided to modify the microphones in order to suppress an echo that resulted from the multi-hop satellite signal distribution.

9. <u>Test-assemble system elements</u>

Any part of the system requiring assembly on site should be test-assembled beforehand. For example, the wooden bases which support the ground stations should be put together according to the blueprint and checked out before being disassembled and shipped into the communities. This will ensure that the base can be assembled as designed and that there is an adequate supply of bolts, screws, etc. Parts can be colour-coded to aid in assembly. (Robbins #13)

10. <u>Translate instructions</u>

If local people will be required to install system equipment, assemble ground station bases, etc. have a non-technical person involved in the test-assembly to ensure that the blueprint/instructions are comprehensible to non-engineers. Where required, blueprints and technical instructions should be translated into layman's language.

11. <u>Make advance shipments</u>

Equipment should be shipped into the community well in advance in order to be there when the installers arrive. The installers may be able to carry some equipment with them but that amount will be limited and the charges (if shipped by air as excess baggage) will be high. Procedures must be established for confirming that equipment has arrived before installers are sent in, in order to avoid the costly and time-consuming situations where installers are in the community and ready to go but lack essential pieces of equipment.

Number the boxes of all shipments so that local contacts can confirm shipment arrival. Have an itemized list of the contents of each box at headquarters.

12. <u>Ship extra supplies</u>

Each location must have a stock of supplies such as cable clamps, tie wraps, canon plugs, RF connectors, washers, bolts, screws, etc. When calculating, for example, the amount of cable or number of tie wraps that are required err on the side of excess. Insufficient supplies will leave the installers sitting in a community waiting to receive an emergency shipment or will require a costly second trip to finish the job.

13. Design shipping crates

Design and build shipping crates that are sturdy enough to survive the shipping, handling and the environment. This is of particular importance for the equipment that will be shipped back and forth for maintenance.

14. Prepare handling instructions

If you want equipment to be handled in a special way when it reaches the community, specific handling instructions must precede the shipment. Fragile stickers are generally ignored. If equipment must be stored in a temperature-controlled environment that also must be specified. The Anik-B ground station dishes, for example, were relatively fragile and required careful handling. The ITC field staff were sent a diagram, prior to shipment, describing the required care and storing of the dish.

15. Arrange for storage space

Storage space is often hard to come by and must be arranged in advance. Space must be found both for items requiring a temperature-controlled environment and those that can support temperature extremes. Storage is recommended for all items, even wooden crates, to provide protection from vandals, curious children or scavangers.

16. Co-ordinate installers' tools

The installers should make a list of all tools required in the installation and check them off as they are packed. In many locations specialized tools will not be available and ordinary tools only at a high price.

17. Obtain permission to string wires

Permission must be obtained in advance from appropriate authorities to permit the stringing of wires on power or telephone poles. If telephone companies balk or ask for unreasonable terms, appeal to their regulatory agency.

18. Arrange for power

Make sure that power service will be available when the installers arrive, both at the ground station site and in the project transmission/reception rooms.

19. Have duplicate keys made

Make sure the local contact people have keys for all project buildings. There must be at least two copies made of each key and procedures established for their storage. This may seem like a trivial concern but major events can be held up while people try to track down the only key to a building which turns out to be in the pocket of someone who is out of town.

20. Know local contacts

The installers must have the names and phone numbers of the local contacts in order to co-ordinate time of arrival and advise of schedule changes.

D. INSTALLATION

1. Prepare installers

The installers must be trained and should carry with them all relevant instruction manuals, trouble-shooting manuals, checklists, etc.

2. Schedule according to the weather

The installation schedule has to be as carefully tied to local weather conditions as possible, in order to reduce delays and cut down on installation costs.

3. Staff adequately

System installation is exhausting work and it is essential that there be an adequate number of installers and that they be given adequate rest periods. For example, ITC arranged for one man to do all the major installation work (everything but installing the ground stations) with assistance from on-site staff. This turned out to be inadequate staffing.

Local staff should not be counted on to be able to free themselves completely from their other responsibilities and ITC should have had two people working full-time on installation.

4. Involve local co-ordinators

The local co-ordinators must have some involvement in the system installation in order to understand the basics of the system operation. It is also essential for the installers to have a local contact to provide advice on local conditions. For example, the ITC installer was advised by the community co-ordinator in one community not to string co-axial cable across the roof of the school because snow is regularly shovelled off the roof and the cable might have been damaged in the process.

5. <u>Have an expediter at headquarters</u>

Someone should be available at headquarters throughout the installation in order to expedite the purchase and shipment of any items that, despite the best of planning, have been overlooked, damaged in shipping, etc.

6. <u>Assemble base on pad</u>

The wooden ground station base should be assembled directly on the gravel pad. Otherwise, if transportation can not be arranged for its relocation (it's bulky and heavy) it will have to be taken apart and re-assembled on site.

7. <u>Establish test time on the satellite</u>

Arrangements must be made throughout the installation process to schedule satellite time for testing purposes. The video transmit ground station should be installed first so that each subsequent ground station can be fully tested. User equipment should be tested at the same time. This will avoid the costly and time-consuming exercise of installing the network and then having to return to track down system problems.

8. <u>Correct problems early</u>

In general, if the installers point out inadequacies in the system they should be remedied as soon as possible. For example, the ITC installer concluded that, in one community the messenger cable was too weak to provide adequate support for the co-axial cable and audio wires. He couldn't guarantee that it would survive the eight months of the project. It was decided to upgrade the system immediately rather than risk problems in mid-winter when replacement would be extremely difficult.

9. <u>Draw up diagrams</u>

Once the installation is completed in each location the installation team should draw up local wiring diagrams and user instructions. Copies should be left in the community and given to the technical supervisor, headquarters, the satellite system providers, etc.

10. Instruct local co-ordinator

The local co-ordinator should be instructed in systems operation and the wiring diagrams should be thoroughly explained.

11. Provide basic tools

Each site should be left with a set of basic tools; eg. screwdriver, voltage meter, soldering gun, needle-nose pliers, side-cutters.

12. Provide basic manuals

It is essential that every site have the operating and repair manuals for all equipment. Even if the local staff do not have the necessary training to make use of the repair manuals, they should be on hand for visiting technicians. Additional copies of the manuals should be ordered at time of equipment purchase because subsequent re-orders take a long time to fill. (MacGregor #9)

X SYSTEM OPERATION

Some of the recommendations regarding system operation have already been discussed under Management. In addition, the following elements are important to smooth system operation.

1. <u>Negotiate an agreement with satellite supplier</u>

   Negotiate an agreement with the supplier of satellite facilities to provide a certain minimum level of operating service. This will mean that the satellite facilities supplier will be expected to repair satellite problems within a specified period of time, overhaul equipment before installation, have an adequate supply of spare parts available and provide trained technical support. The agreement will have to reflect the difficulties inherent in the provision of an experimental service.

2. <u>Establish operating procedures</u>

   A standard set of operating procedures should be established and a copy should be posted at every site. The procedure should include such instructions as how far ahead of transmission time to turn on the satellite equipment and how to make contact with the other ground station sites. It should cover what things to check to make sure the system is operating properly and what to do in the case of technical problems, etc.

   In the case of telemedicine projects, procedures should be established for interrupting scheduled programming for medical emergencies. The criteria for pre-empting programs should be determined and the request procedure clearly outlined. (4, p. 14)

3. <u>Establish procedures for system problems</u>

   The system will break down from time to time and procedures must be established for these eventualities. There must be instructions for both the technical people and the on-air people. For example, the technician should have a checklist or a trouble-shooting guide to go through to determine the seriousness of the problem. Then he/she should contact the responsible staff member according to the procedure. The ITC Project relied on the services of a studio supervisor, located in the video transmit studio, to assist local co-ordinators in tracking down the source of problems. The supervisor would then talk to the Department of Communications, the supplier of the satellite facilities. The technical supervisor would be dispatched to the community only if it was identified as a community equipment problem rather than a satellite problem.

In the meantime, the program audience must be informed of the problem and of the procedure that is being followed. For example, the ITC procedure was as follows:

(a) After a problem arises people are asked to wait one half hour while the problem is assessed. A videotape is aired, on the network if possible, or locally, if not.

(b) After the half hour the technician reports back on the problem. If it can be fixed within the next half hour the audience is asked to wait and watch another videotape. If the problem will take longer to fix, the audience is sent home and the program rescheduled.

(c) If only one community is affected and its participation is not critical to the program, the program carries on without them and technicians work individually with the problem community.

(d) The important thing is to keep everyone, especially the audience, informed as to what is happening.

4. <u>Provide continual on-site assistance</u>

During transmission a staff member should be in the transmission room at all times to monitor the system performance and help the users to cope with any equipment problems. If there is not an experienced staff member on hand, users can get very discouraged by even minor system problems.

5. <u>Establish maintenance and repair procedures</u>

Maintenance and repair procedures must be established. A common element in projects which have good technical performance is a first rate technician, on-site or available on a regular basis. (13, p. 67) In addition, reliable and prompt repair and maintenance services must be organized.

It would be optimum if all equipment maintenance and repair could be done on site but this is not possible with the level of complexity of satellite and production equipment. In most cases a controlled environment, sophisticated test equipment, specialized instrumentation and highly trained technicians are required for equipment repair and maintenance. Many spare parts are too expensive to stock. In most cases therefore, there is no alternative but to ship equipment out of the community for repair and maintenance. This is unfortunate because it results in long delays, shipping costs and the danger of equipment being further damaged in shipping.

The problem can be eased, if not solved, by having an adequate number of back-up units. For example, a telehealth project based in Northwestern Ontario used parts from a spare unit to replace faculty parts in their slow scan equipment. The faulty parts were then sent out for repair. (12, p. 54)

6. Monitor operating environment

Make sure that equipment rooms are kept as dirt-free as possible and that the temperature is kept within the required range. This can be a difficult proposition in communities which suffer from power outages, unreliable oil deliveries and where furnaces often function erratically.

7. Test rebroadcast transmitter coverage

It is important to test local transmitter coverage. This will ensure that the transmitter is performing adequately and, if viewer complaints arise, it will help to differentiate transmitter coverage problems from those resulting from a poorly tuned or malfunctioning TV set.

XI EVALUATION

Each project will need to develop an evaluation plan that meets its own objectives. It is beyond the scope of this manual to discuss the evaluation process per se but the following guidelines are offered regarding the relationship between the project and its evaluation from a management perspective.

1. Establish evaluation parameters

   A consensus must be arrived at early in the project as to the parameters of the evaluation. An agreement will have to be reached among the primary participants, the sponsoring organizations, the funding sources, etc. as to the goals of the evaluation and the key questions to be examined. In particular, it is important to ensure that the funding sources clearly spell out their evaluation expectations and requirements right at the beginning of the project.

2. Integrate into the project

   Evaluation should be integrated into the project from the outset in order to facilitate routines of data gathering, to establish mutual support between the project and the evaluator and to ensure that evaluation supports project goals.

3. Control data gathering

   The date gathering should be carefully controlled in order to prevent the participants from becoming overburdered by the demands of the evaluation. The Quebec Telehealth Project found that people became reluctant to co-operate in the evaluation because of the high frequency of requests for opinions. (29, p. 12)

4. Provide on-going feedback

   The evaluator should provide on-going feedback to the project concerning not only overall evaluation findings but also staff concerns, perceived problem areas, etc. It is essential that the evaluator be viewed as a valuable and on-going source of information from the field. Milestones in evaluation should be tied in with project planning.

5. Make evaluator responsible to project

In general, the evaluator must be responsible to the project. This will ensure that the evaluation meets the project needs, that the evaluator has full support in the field, and that evaluation does not interfere with project priorities or make unreasonable demands on project energies. On the other hand, the evaluator must be allowed to carry on with the job, unburdened by the operational demands of the system.

Projects have varied to the extent that they have direct line control over the evaluator. The IITV Project, for example, tried to keep the evaluator at arms length of the project by having him appointed from another department. He was, however, required to make reports to the project management. Each participating college was required to identify a person to work with the evaluator who would be independent of the project operations group but related to the institution. In contrast, in the ITC Project the evaluator reported directly to the Project Director.

6. Look for the serendipitous

It is important that the evaluation not restrict itself to the examination of only the project objectives but also look for serendipitous results, i.e. those that were not the intent of the project but may in the final analysis, be just as significant.

7. Make all staff evaluators

The staff should be involved as much as possible in the data gathering for the evaluation. This will provide the staff with immediate feedback on the project and will encourage them to be responsive to the community. Surveys can be an excellent public relations exercise.

8. Ensure continuity

Serious attempts must be made to ensure continuity in evaluation. It is best if the project can secure a commitment from the evaluator to remain with the project for its duration.

XII FOLLOW-UP

1. <u>Inform decision-makers</u>

   The decision-makers should be provided with the necessary project documentation to allow them to understand project results and achievements and to justify the requirement (if any) for follow-up activities.

2. <u>Inform sponsoring organization</u>

   Public relations work must be done within the sponsoring organization to ensure that it fully appreciates the implications of the project and fully supports the future plans (if any).

3. <u>Inform users and participants</u>

   The users and participants should be informed about the results of the project and any plans for future activity. This could be done in the form of a newsletter summarizing the evaluation report, local screenings of video 'highlights' of the project, etc.

4. <u>Inform service providers</u>

   The providers of operational telecommunications facilities should be informed of the results of the project to provide input to their policies, systems design and service offerings.

5. <u>Start any follow-up activity immediately</u>

   If the decision is made to carry on project activities in an operational system then the transference should be made with as small a gap in service as possible. This is crucial to retain project staff and to maintain user support. (MacDonald #8)

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APPENDIX A

ANIK B

PILOT PROJECT PLAN

1. PROJECT TITLE

   The Inukshuk Project

2. PRINCIPALS IN PROPOSER ORGANIZATION

   2.1 Project Sponsor

   Inuit Tapirisat of Canada (ITC)

   2.2 Project Manager

   Mr. David Simailak, Project Director, Inukshuk

   2.3 Project Coordinator/Principal Contact

   Ms. Lyndsay Green, Operations Manager, Inukshuk

   2.4 Mailing Addresses

   Mr. David Simailak
   Project Director
   Inukshuk
   Baker Lake, N.W.T.
   XOC OAO

   Telephone: 793-2835 - office
   793-2983 - production centre

   Ms. Lyndsay Green
   Operations Manager, Inukshuk
   Inuit Tapirisat of Canada
   176 Gloucester Street, 3rd floor
   Ottawa, Ontario K2P OA6

   Telephone: 238-8181 - office
   Telex: 053-3517

3. PROJECT OBJECTIVES

   1. To assess the usefulness and cost of instruction and information exchange for adults by satellite.
   2. To test the usefulness and cost of conducting educational classes for children via satellite.
   3. To test the efficiency of decision-making and the efficacy of meetings held via satellite and to examine the cost-benefit of these services.
   4. To test the economic viability of an Inuit television broadcasting service.

4. PROJECT SUMMARY

Inuit Tapirisat is a non-profit organization representing 22,000 Inuit in Canada. It was founded in 1971 when a committee of Inuit decided it was time for the native people of the Arctic to speak with a united voice on a host of issues concerning the North. The organization is dedicated to preserving the culture, language, identity and way of life of Inuit and helping them find their role in a changing society. One of its organizational aims is to improve communications to and among Inuit settlements.

To this end, ITC established a communications program in August, 1975 to define the areas of greatest need for improved communications from the Inuit point of view and to carry out specific projects to meet these defined needs. Through this program ITC has learned about the potential of communications to effect the nature and quality of Northern community life and the broader socio-cultural, political, and economic life of the Inuit. ITC's efforts to date have been a continuing attempt to change the structure of the communications systems in the North to better reflect the needs and aspirations of Inuit. ITC's Anik B pilot project is designed to further knowledge and gain additional experience in order to better achieve this goal.

The ITC pilot project will provide an opportunity for Northern users to test out different communications configurations in a variety of situations for the purpose of assessing their relative merits. It will enable ITC to examine these system configurations and weigh their relative cost and effectiveness. The pilot project will allow ITC to acquire the experience necessary to define a communications system structured to meet northern needs and to realistically assess the costs of such a system.

The project will consist of the transmission of a video signal from a studio in Frobisher Bay and reception in the five communities of Baker Laker, Cambridge Bay, Eskimo Point, Igloolik and Pond Inlet. A conference circuit will provide for live audio interaction among all of the communities. The six communities were selected on the basis of a number of criteria including their commitment to the project, the presence of local communications projects and ITC's desire to include as many regions as possible in the system. These communities are in the three regions of Baffin, Keewatin and Central Arctic.

The Anik B programming will consist of both live and pre-taped programs. The programming will be a mixture of teleconferencing and broadcasting. Audio teleconferencing will be tested with and without the one-way video. The ITC system will allow the video signal to be received in a small meeting room only or in a large meeting room only. In some communities the same room will be used for both small and large meetings. In all communities, except for Igloolik, there is also the capability of broadcasting the signal locally over a low power T.V. transmitter. People will be asked to come to either the small or large meeting rooms to participate in the teleconferencing. The school children will have the additional option of remaining in their classroom and placing calls from a telephone which will be patched into the conference network.*

Programming is being developed in consultation with the six communities. A community co-ordinator will be working in each community for five months prior to the start-up of the project to assist community groups in program development.

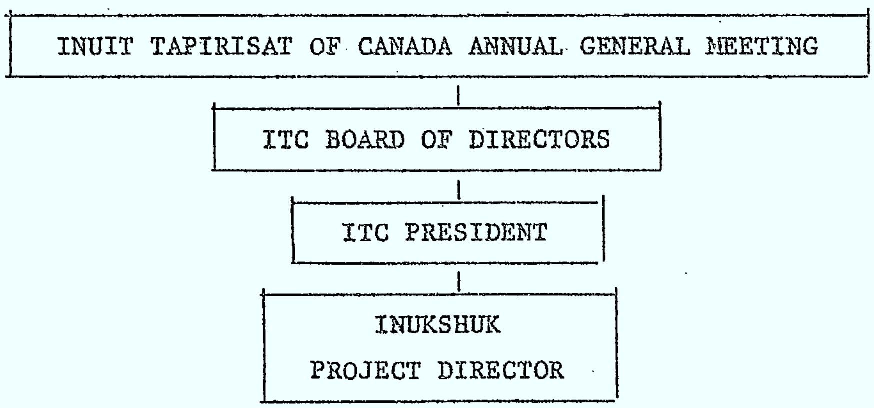
The community co-ordinators will be using an information booklet and videotape to inform community groups of the capabilities and limitations of the ITC system.

It is anticipated that principal users of the system will be land claims committees, education committees, Hunters and Trappers Associations and senior citizens. National and regional Inuit organizations will also be major users of the system. The local schools will be participating in programming for Inuit teachers and for classroom instruction in Inuktitut. Programs produced by Inuit production centres (PIC-TV in Pond Inlet and Nunatsiakmiut in Frobisher Bay) and by Inukshuk staff (Baker Lake production centre and regional co-ordinators) will be broadcast from the Frobisher Bay studio, along with other videotapes or films of relevance to Inuit concerns.

A videotape distribution system has been set up among 25 communities to assess the cost and effectiveness of circulating videotapes by mail among communities as compared to live satellite distribution.

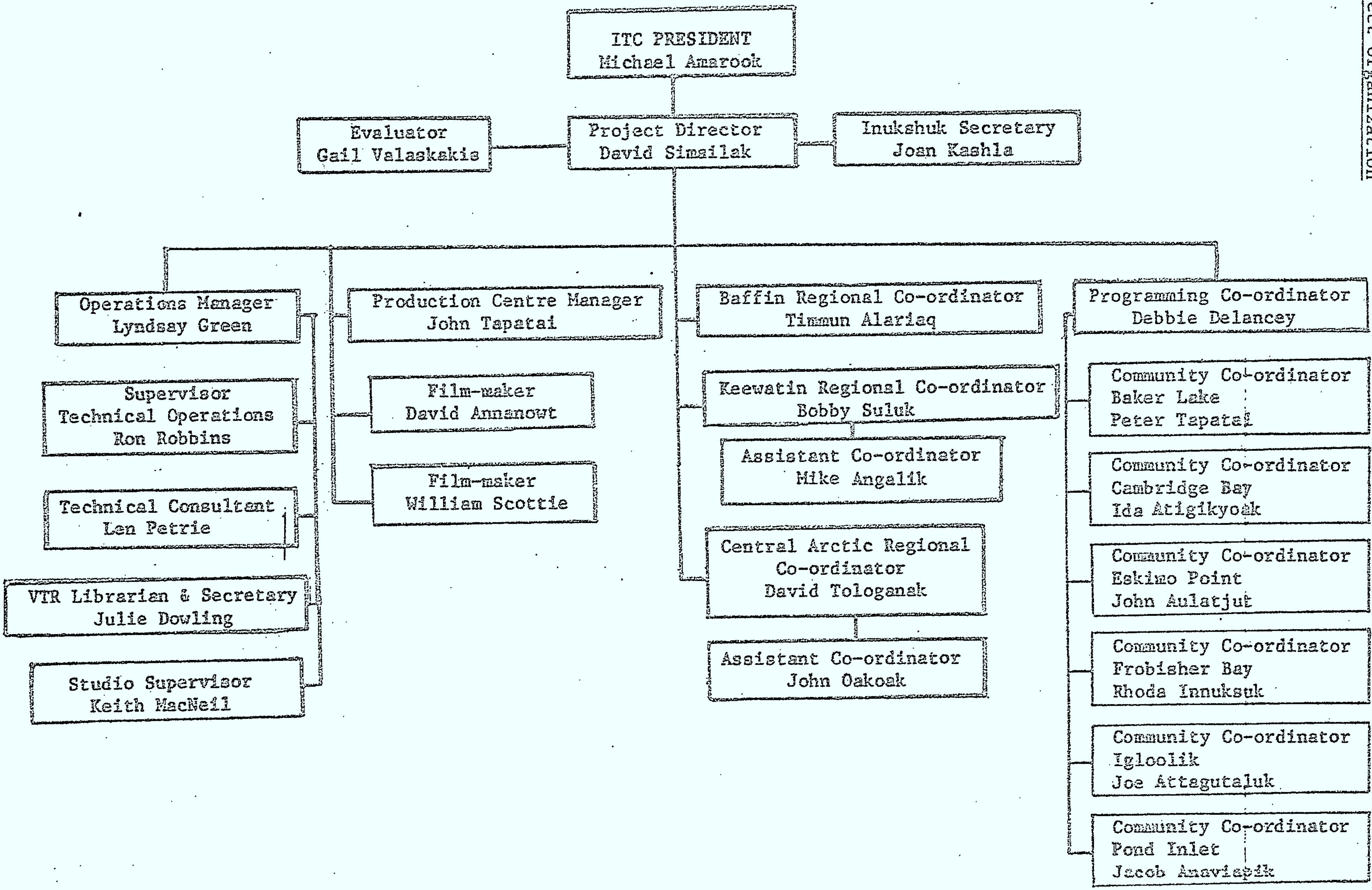
5. PROJECT ORGANIZATION AND MANAGEMENT

5.1 Organization Structure of Sponsoring Agency



*Note: This option is still under consideration and is not incorporated in the systems diagrams.

INUKSHUK PROJECT ORGANIZATION CHART



The Inukshuk staff are all employed full-time on the project with the exception of Petrie, Robbins and Valaskakis. Petrie and Valaskakis are consultants who work on an 'as required' basis. Robbins is a Department of Communications employee who has been loaned to ITC for the duration of the Inukshuk project and works for the project on a 'first priority' basis. All positions shown on the chart are now in effect with the exception of studio supervisor who begins work August 25, 1980.

The Frobisher Bay studio production will be done by Nunatsiakmiut, an independent Frobisher Bay production centre. Nunatsiakmiut will be under contract to ITC for the duration of the satellite phase and their work will be supervised by the studio supervisor.

The community councils in each community are consulted on local decisions and have donated time and resources to the project. A local society in each community has applied to hold the license for the low power television transmitter. ITC has entered into affiliation agreements with these local societies to provide them with up to sixteen and a half hours per week of Anik B network programming. These societies are also doing local work to support the project on a volunteer basis.

The Inukshuk Project has its progress monitored by the Anik B Liaison Committee. This Committee is comprised of representation from ITC, the Department of Indian and Northern Affairs and the Department of Communications. The Inukshuk Operations Manager prepares Quarterly Reports and budgets for the liaison committee. The Committee monitors the progress of the project and approves the budget for payment by the Department of Indian and Northern Affairs. This Committee also reviews the reports of the Evaluator.

The Inukshuk Project Director reports to the ITC President and the Board of Directors on the progress of the Project. One of the Board members is Director of Communications with particular responsibility for the project. Inukshuk submits monthly progress reports to the President and Director of Communications.

5.3 Project Reporting

Responsibility for reporting is as follows:

Project Management (Project Director and Operations Manager)	- Monthly reports to ITC President and Director of Communications - Quarterly reports to Anik B Liaison Committee - Reports for Evaluator

- Approval of Evaluation reports
- Recommendations to ITC Board of Directors for future systems
- Regular Coordination with DOC
- Preparation of Project Plan for DOC
- Release of Final Project Report
- Release of Future Systems Recommendations

Technical Operations (Operations Manager, Technical Consultant, Supervisor - Technical Operations, Studio Supervisor)	- Regular reports from technical consultant to Operations Manager - Reports as requested to Operations Manager from Supervisors - Technical systems description - Facilities descriptions at all sites - Progress Reports as required by DOC - Operating instructions for all sites - Operations Plan in conjunction with DOC - Maintenance Policy/ Procedures - Contributions to Final Evaluation Report - Technical Evaluation of system design and equipment performance - Recommendations to Project management for future systems
Program Development (Programming Co-ordinator, Community Co-ordinators)	- weekly progress reports to Programming Co-ordinator from Community Co-ordinators - Programming support material

	- Schedule of programs - Reports as required by Evaluator
Evaluation	- Reports as required by Anik B Liaison Committee - First Interim Evaluation Report - September, 1979 - Second Interim Evaluation Report - September, 1980 - Final Evaluation - Recommendations to Project Management for Future Systems
Anik B Liaison Committee	- Reports to DIAND and DOC on project progress - Recommendations on quarterly payments

5.4 Project Schedule

See following three pages

	OCTOBER 1979	NOVEMBER 1979	DECEMBER 1979	JANUARY 1980
1. Community Co-ordination			Co-ordinator's Resource Material gathered (catalogues)	
2. Program Development				
3. Training				
4. Operations		ITC-DOC Consultation Meeting NCPC informed of power needs DOC, CRTC licence applications submitted		
5. System Design	Diagrams of system design completed Total equipment list prepared Size & channel of transmitters determined Petrie equipment flow chart drawn up	Major community hardware ordered Feasibility of character generator determined Decision made on tower for C.B. F.B. studio equipment selected Radio links specified Microphone conversion feasibility determined	Microphones ordered Feasibility of using facsimile in Anik B determined	Signalling device feasibility determined
6. System Testing		2-wire teleconference system tested		
7. System Installation	Building materials obtained for F.B. construction	Muting done and locks installed on video projector and T.V.'s Electrical work begun on F.B. studio	Work continues on F.B. studio	Work continues on F.B. studio Video projector & T.V.'s shipped to communities with storage cabinet completed
8. Videotape Distribution	Instructions distributed on care of playback equipment First playback units shipped to communities	Inukshuk videotape catalogues prepared & distributed Videotape prepared by B.L. on how to care for playback equipment Names of local contacts obtained		
9. Evaluation	First Interim Evaluation Report submitted		Briefing Session - Ottawa Research Priorities	

	FEBRUARY 1980	MARCH 1980	APRIL 1980	MAY 1980
1. Community Co-ordination	Programming Co-ordinator (P.C.) hired	P.C. consults with organizations in Anik B communities P.C. recommends hiring of community co-ordinators (C.C.) in Anik B communities	Inukshuk Users Manual completed P.C. completes hiring of C.C.'s	C.C.'s work with community organizations to explair Anik B system Anik B videotape completed
2. Program Development				
3. Training				Workshop for C.C.'s People trained in operation of Anik B transmit studio
4. Operations	Funding application summitted for B.L. Production Centre Submit budget and quarterly report to Liaison Committee			Submit preliminary program schedule to DOC
5. System Design	T.V. transmitters ordered			
6. System Testing		4-wire facsimile tested in Ottawa Frobisher Bay studio equipment tested	Studio equipment tested in Frobisher Bay 4-wire teleconferencing system tested in Ottawa	
7. System Installation	Modifications to facsimile F.B. Studio work completed		Studio equipment shipped to Frobisher Bay	
8. Videotape Distribution				Videotape catalogue distributed
9. Evaluation				Evaluation started on video tape distribution syste Research techniques discussed with C.C.'s & P.C. Production centre training program evaluation

	JUNE 1980	JULY 1980	AUGUST 1980	SEPTEMBER 1980
1. Community Co-ordination	C.C.'s continue work with organizations and visit individual homes C.C.'s submit initial list of Anik B users and program topics	C.C.'s work on Anik B programming Individual assigned responsibility for ground station in each community	C.C.'s learn procedures for schedule changes, equipment breakdowns, sign-on, sign-off	C.C.'s assist communities to use Anik B
2. Program Development	Videotapes prepared introducing each community A-V material gathered as required by Anik B users P.C. works with national & regional organizations on program development P.C. draws up sample programming schedule P.C. works with Land Claims, Maliiganik Tukisiiniakvik, etc. on programming N.W.T. Dept. of Ed. formalizes program ideas University of Regina formalizes program ideas	P.C. continues June work A.V. material gathered as required by Anik B users	Procedures for schedule changes etc. as above prepared by P.C. P.C. draws up preliminary program schedule Graphics prepared including photos of users and communities	C.C.'s finalize schedule with users
3. Training		People trained in ground station operation by DOC People trained in operation of Inukshuk equipment by Robbins	Workshop for C.C.'s in Frobisher Bay People trained in operation of Inukshuk equipment by Robbins	
4. Operations	Submit detailed systems diagrams to DOC Submit budget and quarterly report to Liaison Committee	MOU signed with DOC		
5. System Design				
6. System Testing	Equipment tested on Anik B at CRC Ottawa			
7. System Installation	PIC-TV Building to be in place Fencing & ground station platforms shipped to communities Telephones installed by Bell Canada, CNT Gravel pads laid in B.L., Igloolik, F.B. All satellite equipment rooms ready including power and heat	Teleconferencing equipment shipped to communities Installation completed of all Inukshuk equipment except transmitters July 15 - 30 ground stations installed by DOC and tested	Transmitters installed	
8. Videotape Distribution				
9. Evaluation		Video distribution evaluation	Agree on research techniques for the interactive phase with P.C. and C.C.'s	Second Interim Evaluation Report Present research methodology for interactive phase to Liaison Committee

SCHEDULE SIGNIFICANT CONDITIONS

ACTIVITY	START CONDITIONS	COMPLETION CONDITIONS
1	Selection of Communities and Community Co-ordinators Hired	Community Participation Fully Defined and Organized
2	Programming Co-ordinator Hired	Programs Fully Developed
3	Training Programs Designed to Meet Needs	Staff Fully Capable of Handling Responsibilities
4	Estimates of Costs	Finances and Sources Defined and Approved
5	User Needs Defined and Systems Design Developed	System Designed and Checked Out by DOC
6	Equipment Modified for Systems	System Checked Out on Anik B - Ottawa and again in Communities
7	Equipment Received or Modified	Ready for Operations
8	Agreement to Cost/Share from Communities	Videotape Distribution System in Full Operation
9	Begin Definition of Evaluation	Issue Reports

6. OPERATIONAL PLAN

6.1 Overview

The project timetable can be summarized as follows. The Planning, Training, and Production Phase ran from November 1, 1978 - March 31, 1980. This phase consisted of extensive consultation in the communities, the running of training programs and the production of videotape and film material. The Pre-Test Phase for the circulating of this program material will run from April 1, 1980 to the end of the project. The Operations Phase is the live satellite interactive phase scheduled to begin September 1, 1980 and run until February 16, 1981. The final Wrap-Up Phase will complete 1981.

The Operations Phase has been scheduled over a six month period in order to give individuals and groups adequate time to assess how the system serves their day-to-day needs. This six month period has been scheduled in the fall and winter months to allow the schools to fully participate and to coincide with the time of maximum activity in the communities.

At the end of the six month period we will have accumulated data on:

a) the participation

b) the impact of the Inukshuk project in the communities

c) the cost of the programming and coordination activity

d) the value of interactive communications vs. program broadcasting

e) the value of one-way video teleconferencing vs. audio teleconferencing

f) the cost and value of videotape distribution by mail and air freight vs. satellite broadcasting

and will have acquired some experience with broadcasting and telecommunications facilities and trained Northerners in their operation and minor maintenance. Many potential Northern users with whom we may be able to cost-share facilities in the future will have the opportunity to see the Inukshuk satellite facility in operation. These potential users include the Northwest Territories Government, the various Federal government departments working in the North and private industry. We will be encouraging these potential users to consider the cost/benefits of the satellite service and to compare these to their current methods of communications. Some of these potential Northern users may be invited by community organizations to participate in specific workshops or adult education sessions. In addition, these groups may be permitted to conduct their own meetings or workshops during Inukshuk programming time if community and Inuit group needs have already been met for a given time period.

6.2 <u>Pre-Operations Preparation</u>

The priority activities in preparation for the operational phases are:

1. Obtain support and financial commitment for project from the Department of Indian and Northern Affairs.

2. Consult with Inuit organizations to identify programming needs and potential program producers.

3. Consult with communities in order to identify pilot project communities and consult with these communities to identify users and prepare Anik B programming schedule.

4. Carry out training programs to train Inuit film-makers and video producers and teach co-ordinators about the Anik B facility.

5. Build and equip the regional production centre in Baker Lake and the live studio in Frobisher Bay for interactive video transmission.

6. Produce videotapes for use on Anik B and to circulate among communities.

7. Carry out a pre-test of the pilot project by mailing or carrying videotapes to communities and screening for target audiences.

8. Identify appropriate locations in each community and do required construction work.

9. Define and purchase the systems equipment and test and install.

10. Detail and apply the evaluation methodology.

6.3 Operations

6.3.1 Communications System Description

The programming activity will consist of the one-way video and audio transmission of meetings, classes for children, instruction for adults and taped programs with live interaction (in a conference mode) with the five other communities. All six communities will be connected by satellite with one-way video transmitted from Frobisher Bay. The meeting chairman or instructor may be located in any one of the communities but video will be originated only from the studio in Frobisher Bay. Figure 1 is a sketch of the communications system.

In addition, facsimile will be located in each community so that any location can originate material or receive it. Each location will also have VTR equipment to enable them to make copies of the satellite transmissions. All communities, except Igloolik, have video production capability and we are hoping to have a video producer located at Igloolik once the satellite phase is underway.

Location of the facilities in each of the communities is as follows.

X Inukshuk Television Studio in Adult Education Building in Frobisher Bay

A Baker Lake Resource Centre

B Baker Lake Community Hall

C Cambridge Bay Community Hall
D Cambridge Bay - Kitikmeot Office
E Eskimo Point Hamlet Office
F Eskimo Point Community Hall
G Igloolik Hamlet Office
H Igloolik Adult Education Centre
I Igloolik School
J Pond Inlet Community Hall

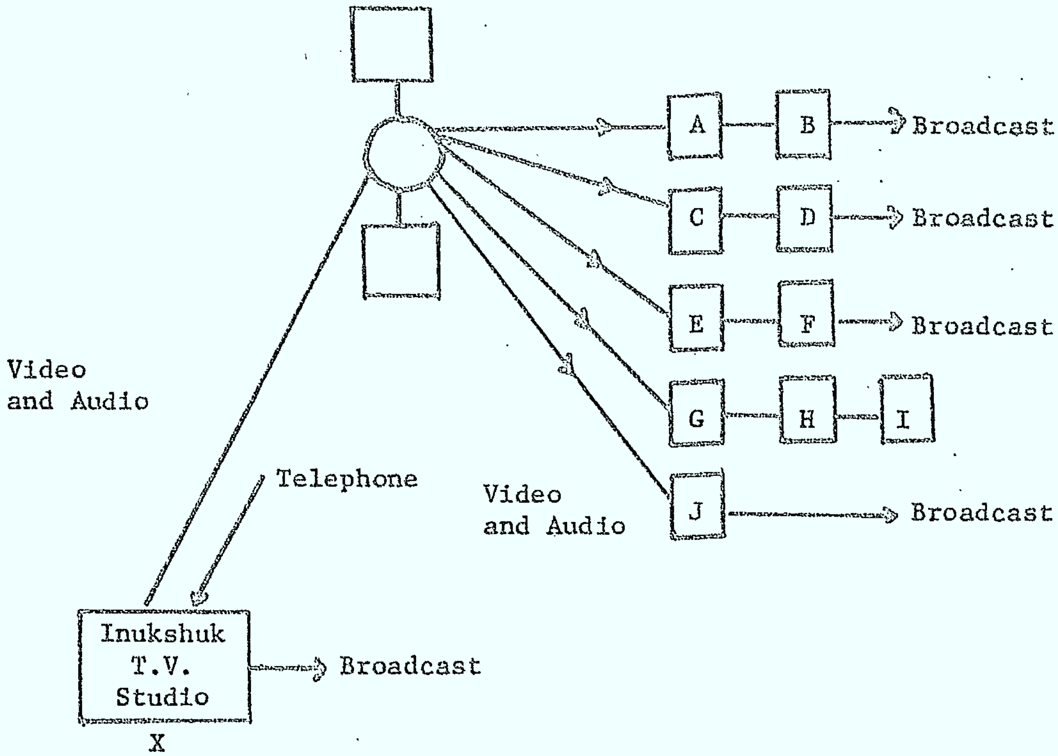


Figure 1

COMMUNICATIONS SYSTEM

Detailed diagrams of the equipment location in each community follow as Figures 2 to 7.

6.3.2 Program Description

Content

The program content will be determined by the Programming Co-ordinator on the basis of the consultation carried out by the Community Co-ordinators and after approval of the Project Director. The programming time will be allotted among four different uses:

1) Adult Education

2) Children's Education

3) Inuit Broadcasting System

4) Meetings.

A sample programming schedule for the month of October is attached as Appendix 1. The programming schedule will be established by August, 1980 for programming start-up September 29. Satellite time during the month of September will be used to test the system equipment, train the staff in system operation and familiarize community groups with optimum use of the system.

Production Facilities

A studio has been built and equipped in Frobisher Bay for live transmission of the Inukshuk programming. The studio production work will be contracted to Nunatsiakmiut, the Frobisher Bay communications society. Additional programs for Anik B will be produced using the following resources:

1) Baker Lake Production Centre

2) Central Arctic Regional Co-ordinator located in Cambridge Bay

3) Keewatin Regional Co-ordinator located in Eskimo Point

4) Pond Inlet Community Television Society.

In addition, it is our goal to locate a video producer in Igloolik to produce local productions for the duration of the project.

LOCATION OF EQUIPMENT

BAKER LAKE

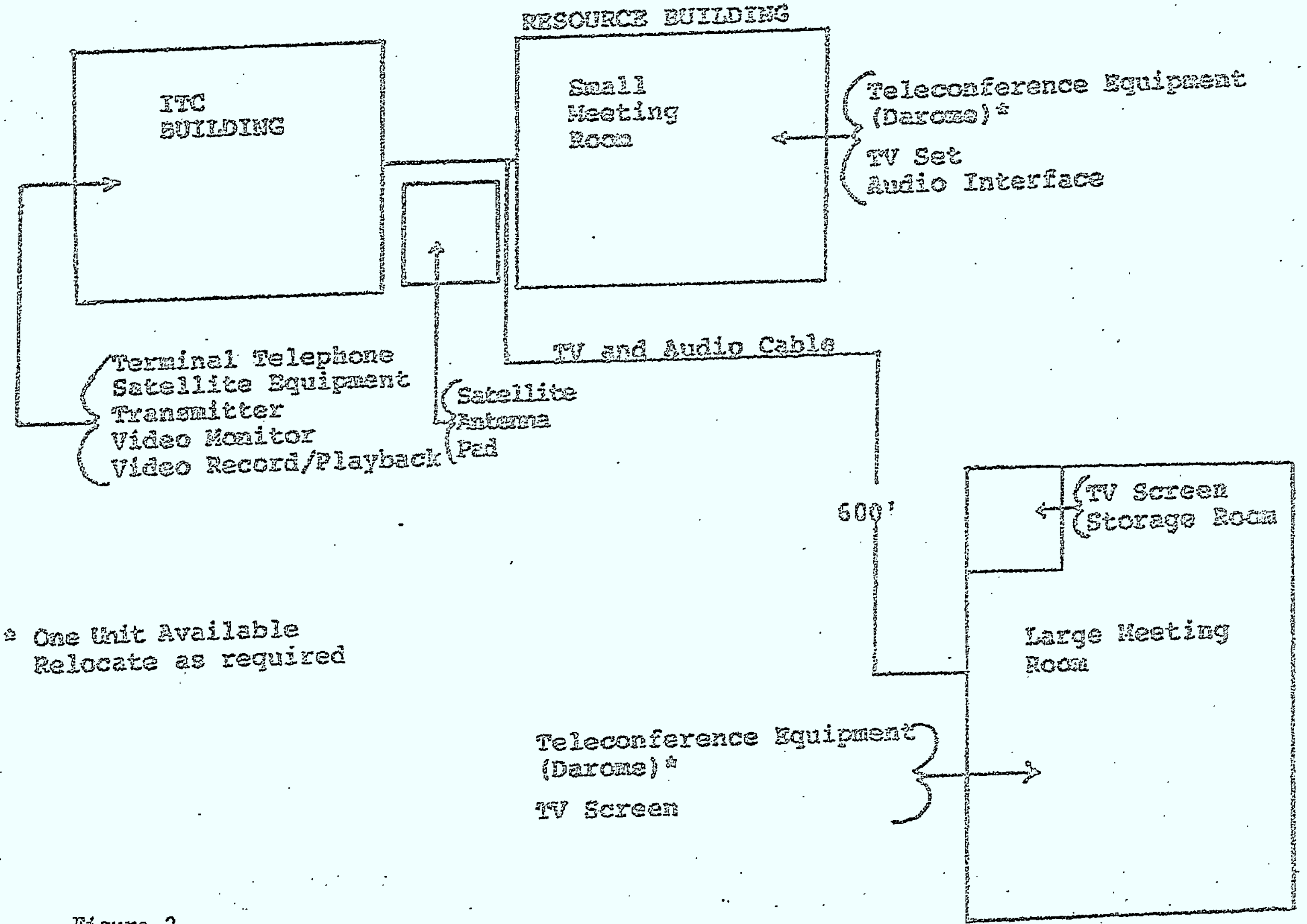


Figure 2

LOCATION OF EQUIPMENT

CAMBRIDGE BAY

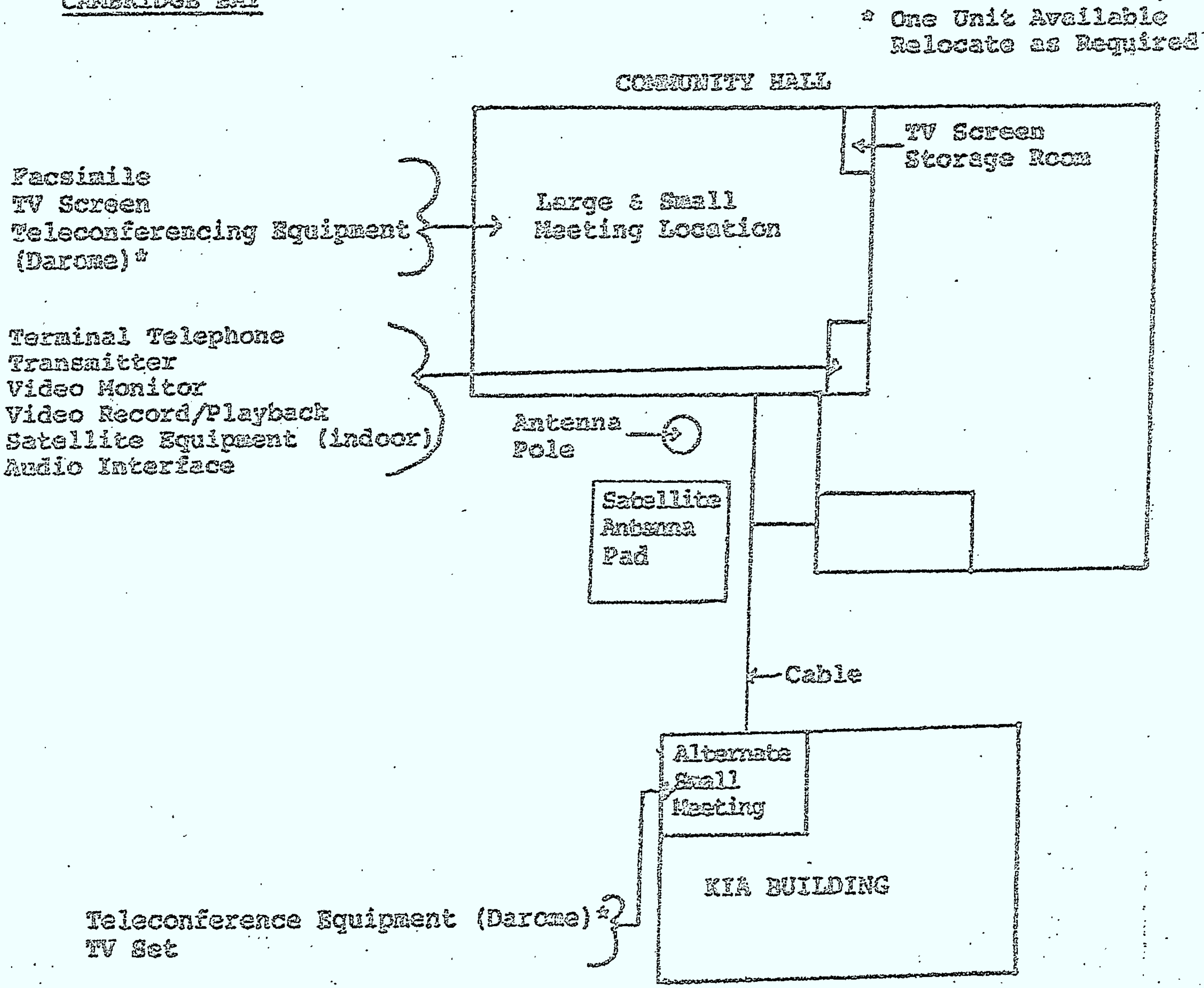
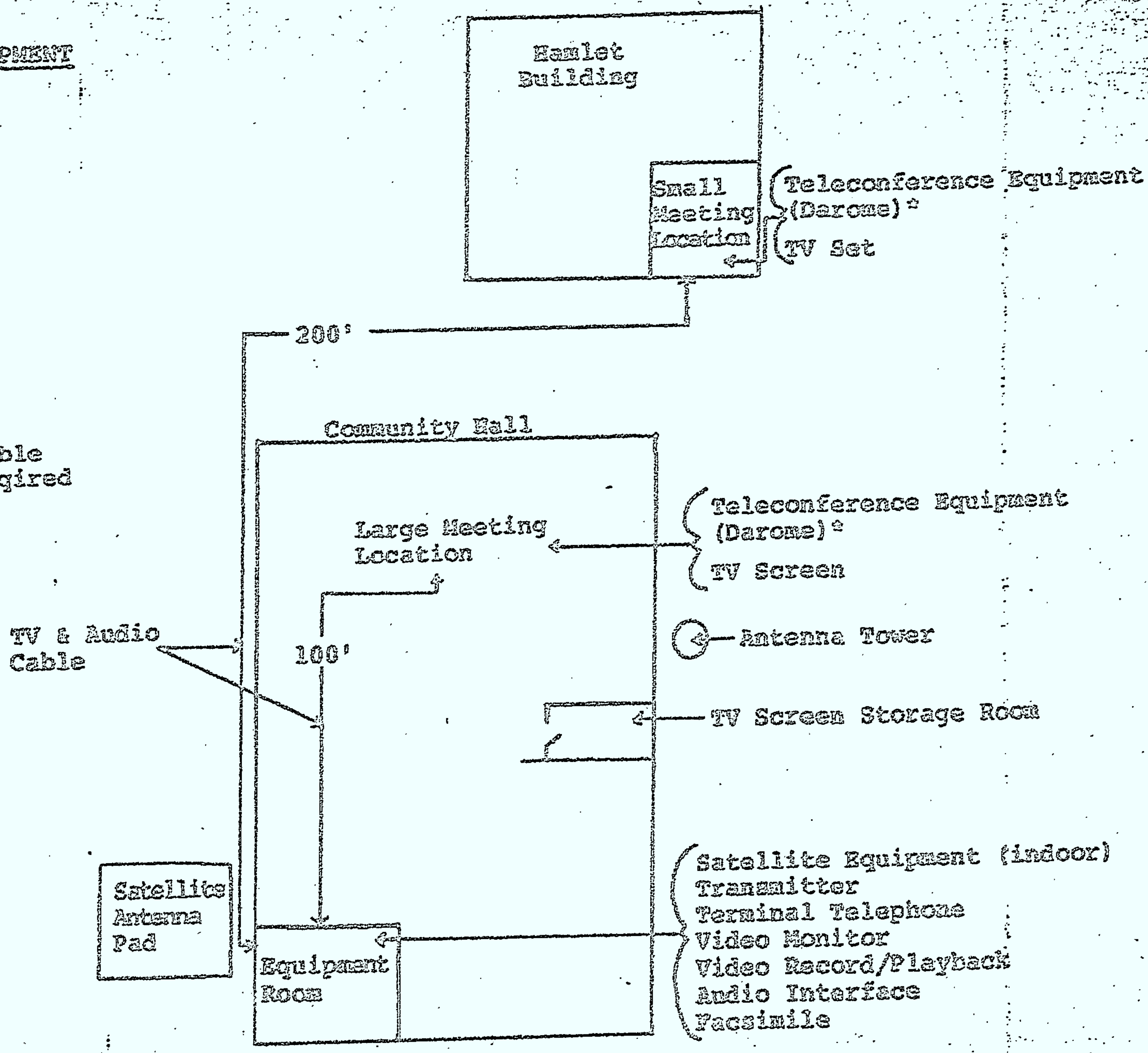


Figure 3

LOCATION OF EQUIPMENT

ESKIMO POINT



* One Unit Availble
Relocate as Reqired

Figure 4

LOCATION OF EQUIPMENT

FROBISHER BAY

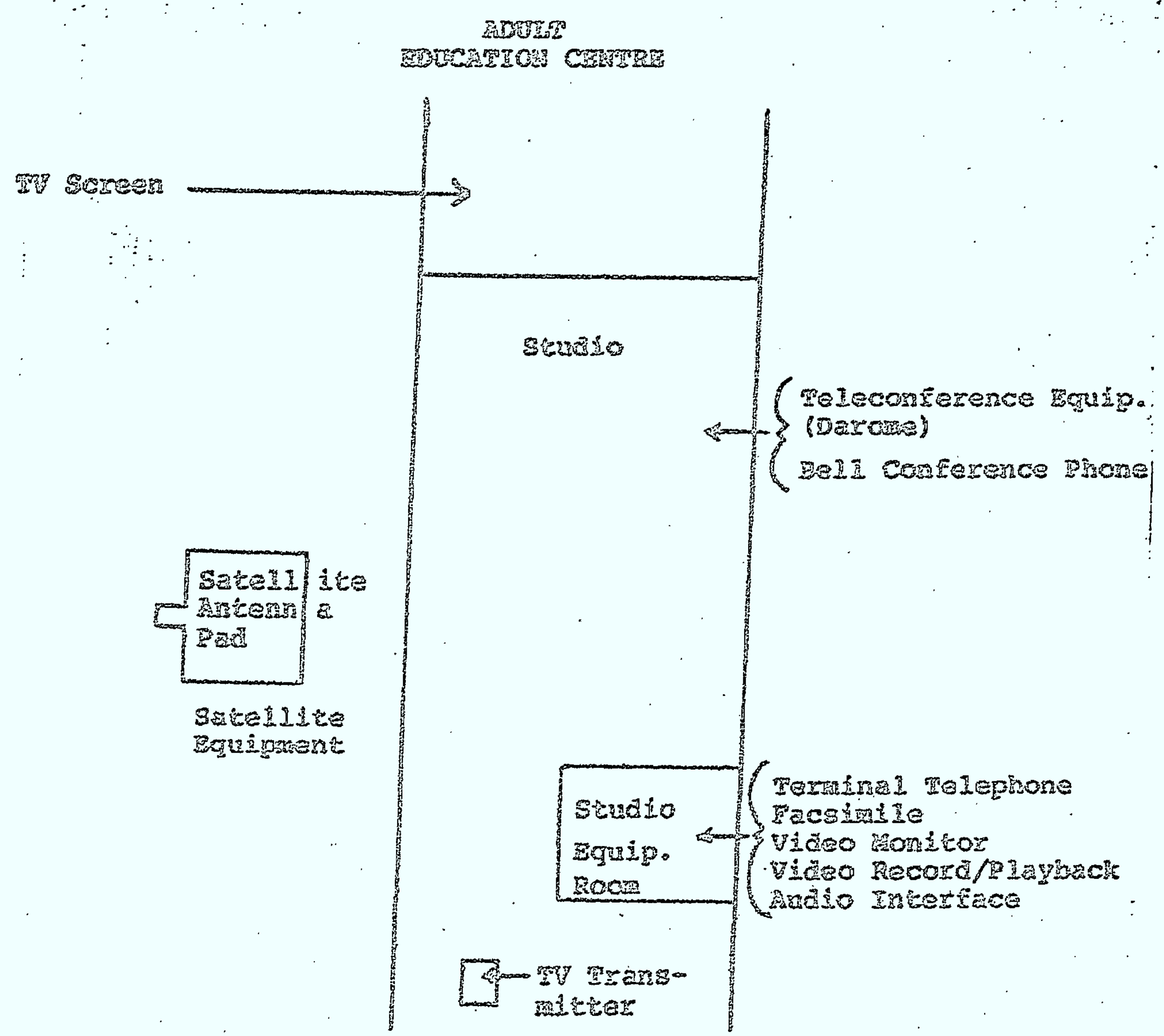


Figure 5

LOCATION OF EQUIPMENT

IGLOOLIK

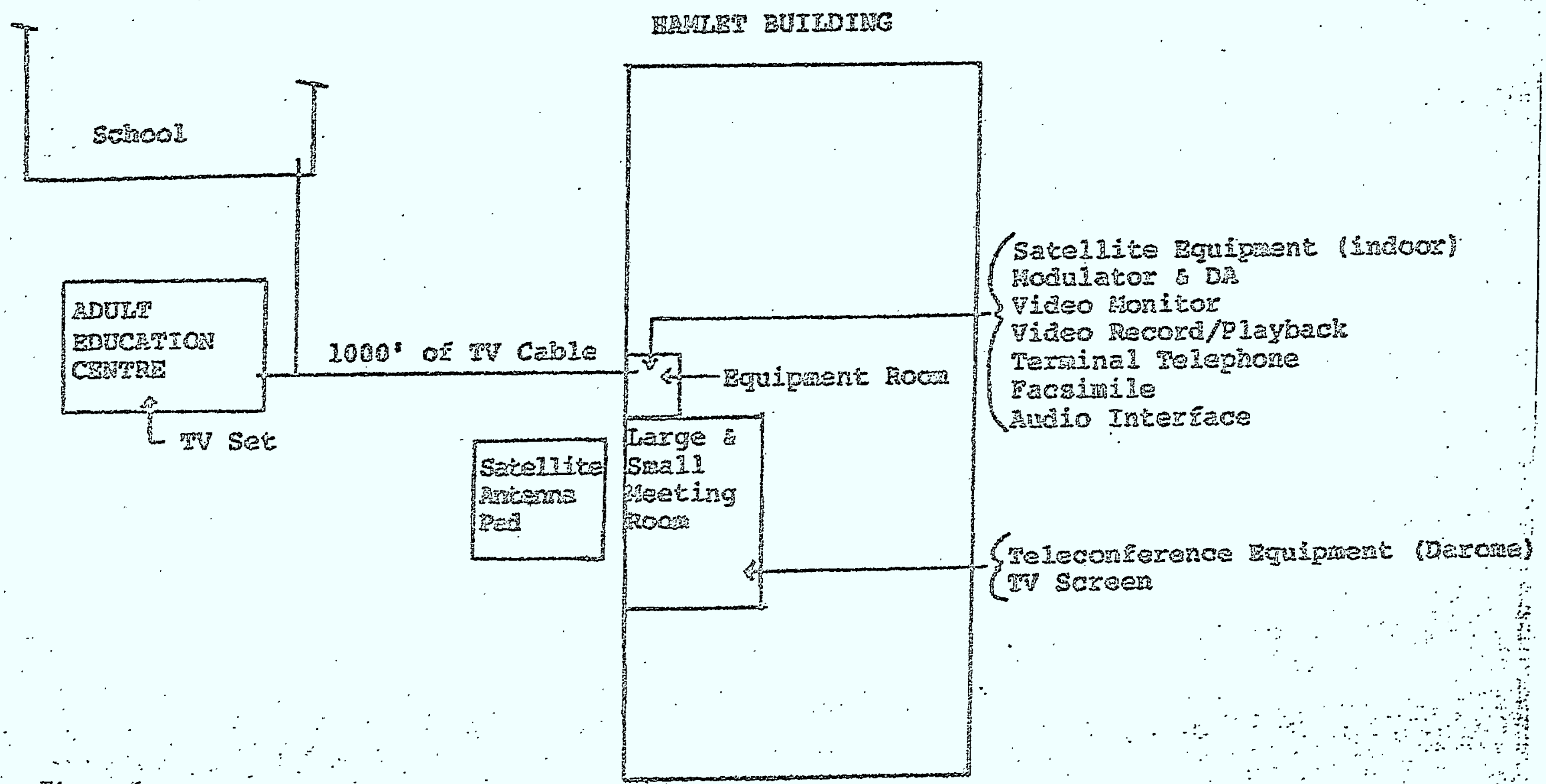


Figure 6

LOCATION OF EQUIPMENT

POND INLET

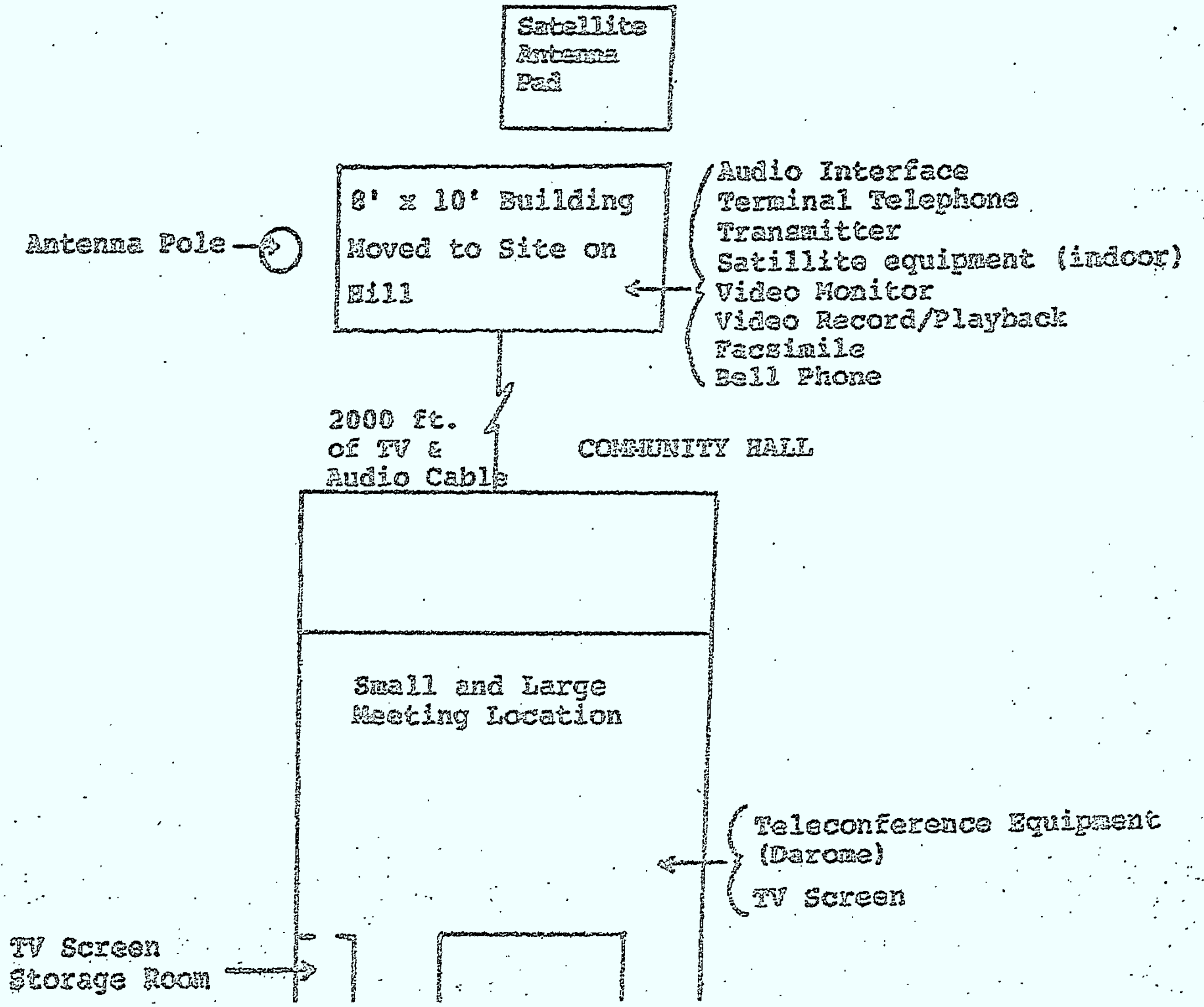


Figure 7

Audience

The community co-ordinators will be responsible for co-ordinating the audiences in each community. Some programming will be received in the small meeting room only and will not be broadcast to the entire community. Some programming will be received in the large meeting rooms only and displayed on the video screen. Some programming will be broadcast to the entire community followed by live interaction from the large meeting rooms only.

The community co-ordinators will keep the community advised of the programming schedule through the community radio and by posting notices in public meeting places. The community co-ordinators are holding meetings with every community organization and will be visiting community households. They are showing a videotape describing the project and distributing project manuals that explain the system.

6.3.3 Contingency Plan

If technical or other problems develop, a reduced program will be carried out by videotape and telephone but this will severely reduce the effectiveness of the pilot project and greatly limit the research parameters.

6.4 Post-Operations Activity

- Preparation of a pilot project report incorporating the evaluation findings
- Analyses of needs, costs and future options
- Preparation of recommendations for future systems
- Implementation if approved

7. Evaluation Plan

7.1 Objective

The objective of the evaluation is to document the process by which the Inukshuk Project is implemented and its effectiveness in terms of stated goals.

7.2 Methodology

An external evaluator has been hired to work with the Anik B project staff on a part-time basis for the duration of the project. The information gathered process she has set up is as follows:

Information Gathering

A. Project Development

To report upon the phases of project development, the evaluation will gather information from document review, interviews and field observation. Important documents include Quarterly Reports, transcribed meeting minutes and activity journals kept by Project Regional Directors. To maintain the formative research approach, Project participants will be involved in the evaluation process providing questions, data, insights and feedback for the study.

B. Programming

During the experimental phase, Inukshuk will transmit Inuttitut programming through the Anik B satellite system. To report upon the nature and effectiveness of this programming, the evaluation will detail produced, broadcast and distributed material and community access, participation and response. Information gathering will depend upon logs, kept by participating communities and material from the Regional Directors. Should it prove appropriate, content analysis will be used to detail the nature of the programming.

C. General Interpretive Framework

General interpretive considerations related to the Project are reflected in the following questions:

a. Has the Project increased the amount and quality of communications among participating communties?

b. Has the Project provided the communities with increased access to information through inter-active video technology?

c. Have Inuit organizations used the network to give and receive information through videotape and film?

d. To what extent have existing Inuit broadcasting porjects been enriched as a result of the Project?

e. Has programming changed as a result of the Project? How? To what extent?

f. To what extent and in what way have Inuit been trained with regard to media through the Project?

g. Does programming developed through the Project reflect information relevant to Inuit more than was the case prior to the Project?

h. Has the Project encouraged the production and distribution of films and videotapes which relate to Inuit language and culture?

i. What community-level activities have been initiated or supported through the Project? What role has the Project played? What additional "spin-offs" are related to the Project?

j. To what extent have CBC, government agencies and others utilized opportunities provided by the Project to communicate with Inuit?

k. Has the Project provided any means for Inuttitut broadcasting in the North to become self-supporting?

l. Is video networking an effective and efficient method to instruct and inform Inuit in Northern communities?

m. Is video networking an effective and efficient method to provide Inuttitut educational programming for children in northern communities?

n. Is video networking an effective and efficient method to hold meetings involving northern Inuit? How and to what extent is decision-making affected?

o. What is the economic viability of an Inuit television broadcasting service?

p. What alternative or projected technology might maintain objectives established through the Project?

8. RESOURCES REQUESTED FROM DOC

8.1 Satellite Telecommunications Service

8.1.1 Description

Use of one transponder in the Central West beam and a return voice channel to permit audio teleconferencing among all communities.

8.1.2 Schedule

The time period of September 1, 1980 to February 16, 1981 is requested.

The weekly time periods required are as follows:

Monday Wednesday Friday	1430 - 1700 hrs. EST
Monday Thursday	1830 - 2300 hrs. EST

Appropriate time must also be allowed for technical checks in advance of the program.

8.2 Ground Terminal Equipment

8.2.1 Description and Locations

1 TVT terminal at the Inukshuk TV studio,
Frobisher Bay (63° 44' 55" N
68° 31' 30" W)

5 TVRT terminals as follows:

Resource Centre, Baker Lake (64° 19' 05" N
96° 01' 15" W)

Community Hall, Cambridge Bay (69° 07' N
105° 03' W)

Community Hall, Eskimo Point (61° 06' 30" N
94° 03' 55" W)

Hamlet Office, Igloolik (69° 24' N 81° 47' W)

PIC-TV Studio, Pond Inlet (72° 42' 58" N
77° 58' 40" W)

8.2.2 Interface Considerations

The interface must accomodate:

Standard TV and audio input and output
Voice from microphones (Darome)
Facsimile (Xerox 400 Telecopier)
Signalling device (not confirmed)

8.3 Transportation and Operations

8.3.1 Transportation, Installation and Maintenance

DOC will ship all terminals to and from the identified locations and provide skilled staff to install and take down the terminals. Foundations will be provided by Inukshuk and installed by the regional and community co-ordinators. Inukshuk will have available two people to install the terminals. It is anticipated that DOC will carry out all maintenance. It will be important that any terminal failures are corrected within 48 hours in order to not jeopardize the project.

8.3.2 Operations

Inukshuk will provide an operator for the TV Transmit terminal at Frobisher Bay. Project staff at the 5 TVRT sites will operate these terminals.

8.3.3 Training

It is assumed that DOC will provide full documentation of the performance and interface requirements of the communications system. It is requested that DOC train

Inukshuk staff in operation of the ground terminals during their installation and provide for technical briefings at major meetings of the participants in the project.

8.3.4 Technical Support

It is anticipated that DOC will review plans for technical facilities and provide comments if requested and provide consulting services. It is requested that DOC work with Inukshuk staff to test out interface equipment on the Anik B terminals in Ottawa prior to installation in the North. Consulting services will also be necessary during the installation of the ground terminals and the check-out of our system.

9. RESOURCES TO BE PROVIDED BY PROJECT

9.1 Equipment Description

The following equipment will be used in the project:

- TV studio cameras and audio equipment as presently available at the Inukshuk TV Studio, Frobisher Bay
- 7 Video monitors (one at each location plus spare)
- 7 TV sets (one at each location plus spare)
- 6 Video screens (Sony 7200) (one at each location)
- 7 Video recorder/players(one at each location plus spare)
- 7 Facsimile equipments (one at each location plus spare)
- 6 Speaker, microphone and amplifier assemblies (Darome) (one at each location)

9.2 Site Preparation

DOC was advised of the details of all sites in June of 1979 when a CRC employee accompanied Inukshuk staff members to each community to approve the terminal location. The Supervisor-Technical Operations will be responsible for the installation of all equipment at each site and for systems check-out.

9.3 Interface Considerations

It is anticipated that the pre-test to be carried out in Ottawa will minimize the problems of technical interface. The supervisor of the TV studio in Frobisher Bay will be responsible for following the procedure established by DOC for project start-up and daily operations.

9.4 Manpower Description

Full-time supporting staff will be required as detailed in Section 10.

9.5 Program Software

The project staff will be responsible for determining and developing all program software required for the project.

10. PROJECT BUDGET

10.1 Overall Budget and Cash Flow

The budget for the Pilot Project is estimated to require total funds of $1,899,083. This is broken down under the following allocations:

	1978-79	1979-80	1980-81	TOTAL
Salaries, Benefits	135,700	177,075	163,300	476,075
Equipment (i) Capital	21,000	171,330	---	192,330
(ii) Transmitter Lease	100,000	38,000	---	138,000
Travel	40,000	36,000	44,400	120,400
Training (i) Workshops	36,000	45,000	80,000	161,000
(ii) Organizational & Technical	136,000	---	---	136,000
Programming, Inuit Production Centers	70,000	60,000	60,000	190,000
Professional and Technical Fees	10,000	15,000	25,000	50,000
Production Studio Modifications	70,000	---	---	70,000
Associated Operational Costs				
Northern Staff Overhead				
Shipping				
Telephone				
Information Kits, Newsletters				
Insurance, Ground Station Operation				
TOTALS	41,700	76,600	113,300	231,600
I.T.C. Administration				
i) Accounting Services				
ii) Office Space				
iii) Secretarial Services				
iv) Printing and Stationary				
TOTALS	41,440	43,638	48,600	133,678
GRAND TOTAL	701,840	662,643	534,600	1,899,083

Detailed break-downs of the above budgeted funds are as follows:

See following six pages

ITC ANIK B BUDGET

PLANNING, TRAINING & PRODUCTION PHASE: One Year

Staff

Project Director	$24,000	
Operations Manager	$22,000	
Regional Co-ordinators 4x$18,000 (average)	$72,000	
Staff Benefits - 15%	$17,700	
		$135,700

Capital Costs

7 3/4" video playback units @$3,000 each	$21,000	$21,000

Operational Costs

Travel costs 6 people x $6,000	$36,000	
Northern staff overhead expenses (offices, etc.) 5 people x $3,600	$18,000	
Crating and shipping of video equipment 7 units x $500	$ 3,500	
3 training and consultation workshops for regional co-ordinators 3 x $10,000	$30,000	
Shipping tapes 5 tapes x 20 communities x $50	$ 5,000	
Telephone 6 people x $1,200	$ 7,200	
Consultation fees technical consultant, evaluator	$10,000	
Contract funds to commission programming from Nunatsiakmiut, PIC-TV, etc.	$70,000	
Studio modifications (estimated) Nunat. $50,000 PIC-TV $20,000	$70,000	
Production of Anik B information kit	$ 4,000	
Preparation of videotape regarding CTS project	$ 1,000	
Information services - radio production, newsletter	$ 3,000	
ITC administration cost 10%	$41,440	
		$299,140
		$455,840

PRE-TEST PHASE Nine Months

Staff

Project Director	$ 18,000	
Operations Manager	16,500	
Regional Co-ordinators - 4	54,000	
Staff benefits 15%	13,275	
		$ 101,775

Capital Costs

Audio Systems:	console	1,000		
	3 microphones @ $75	225		
	amplifiers	450		
	4 speakers @ $200	800		
	wiring and cable	175		
	6 communities x	2,650	15,900	
6 monitors @ $600 each			3,600	
6 facsimile units @ $3,500 each			21,000	
				$ 40,500

Operational Costs

Travel costs 6 people x $6,000	36,000	
Northern staff overhead expenses (office,etc.) 5 people x $2,700	13,500	
Consultation workshops for regional co-ordinators 3 x $15,000	45,000	
Telephone 6 people x $1,400	8,400	
Shipping of audio equipment, monitors, facsimile units 6 communities x $600	3,600	
Shipping tapes 20 tapes x 30 communities x $50	30,000	
Consultation fees technical consultant, evaluator	15,000	
Contract funds to commission programming from Nunatsiak, PIC-TV and other sources	60,000	
Information services - radio production,newsletter	3,000	
ITC Administration cost (10% minus Production centre)	43,638	
		$ 258,138

...cont'd.

Equipment and Installation Costs

Hydro installation costs 6 locations x $100	$ 600	
Construction of gravel pad and installation of ground station 6 location x $2,000	12,000	
Coaxial cable link or telementry link between ground station and production studios	40,000	
Technican's fee to install audio systems and travel costs	15,000	
Fence - 6 communities x $2,000	12,000	
		$ 79,600

Production Centre - Capital and Operating Costs

Staff

2 cameramen @ $14,000 each	28,000	
Lighting and soundman	12,000	
Editor	12,000	
Bookkeeper (part-time)	8,000	
Secretary (part-time)	6,000	
Staff benefits	9,300	
		$ 75,300

Equipment

Film equipment and accessories	5,000	
Video Equipment and accessories	33,000	
Studio lights	1,500	
Audio recorder	2,000	
Video tapes	2,100	
Super 8 films	2,100	
Transportation - gas	530	
Crating and shipping costs	2,000	
Equipment repair, maintenance	3,000	
		$ 51,230

...cont'd.

Office

Building construction or alterations	$ 10,000	
Refrigerator, sink, honey bucket, etc.	300	
Basic office supplies including chairs, typewriter, paper, stamps	1,000	
Telephone	1,200	
Hydro	1,500	
Insurance - equipment and building	1,100	
Auditor Fees	2,000	
Heat	1,000	
		$ 18,100
TOTAL:		$ 624,643

OPERATIONS PHASE Six Months

Staff

Project Director	$ 12,000	
Operations Manager	11,000	
Regional Co-ordinators 4 @ $ 18,000 per annum	36,000	
Community Co-ordinators 4 @ $ 12,000 per annum	24,000	
Staff Benefits 15%	12,450	
		$ 95,450

Operational Costs

Travel costs 6 people x 5,000	30,000
Northern staff overhead expenses 9 people x $ 1,800	16,200
3 training and consultation workshops for regional co-ordinators 3 x $ 20,000	60,000
Telephone 6 people x $ 1,400	8,400
Consultation fees - technical consultant, evaluator	15,000
Shipping tapes 20 tapes x 30 communities x $ 50	30,000
Contract Funds to commission programming from Nunatsiak, PIC-TV, etc.	60,000
Information services - radio production news-letter	1,500

... cont'd

ITC Administration costs - 10% of total	$ 34,865	
		$ 255,965

Ground Station Operating Costs

Fuel oil 6 communities x $500	3,000	
Hydro cost for ground stations and transmit equipment 6 communities x $750	4,500	
Insurance for 3rd party liability 6 communities x $750	4,500	
Staff to monitor and repair equipment	18,000	
Shipping expenses	2,100	
		$ 32,100
TOTAL:		$ 383,515

WRAP-UP PHASE Six Months

Staff

Project Director	$ 12,000	
Operations Manager	11,000	
Regional Co-ordinators - 4	36,000	
Staff benefits 15%	8,850	
		$ 67,850

Operational Costs

Travel costs 6 people x $2,400	$ 14,400	
Northern staff overhead expenses 5 people x $1,800	9,000	
Wrap-up workshop	20,000	
Telephone 6 people x $600	3,600	
Consultation fees - technical consultant, evaluator	10,000	
Publication and distribution of final report	5,000	

...cont'd.

Preparation and distribution of Anik B videotape	$ 6,000	
Information services - radio production, newsletter	$ 1,500	
ITC administration cost - 10% of total	13,735	
		$ 83,235
		$ 151,085
ITC ANIK B PROJECT TOTAL		$ 1,615,083
Training Funds Incorporated in Total Funding Requirements		$ 284,000
ITC ANIK B PROJECT TOTAL		$ 1,899,083

10.2 Funding Sources

The funds for this project have been obtained from the Department of Indian and Northern Affairs. A Memorandum of Agreement was signed between the Department and ITC on November 7, 1978 committing the Department to contribute an amount not to exceed $1.9 million in the fiscal years 1978-79, 1979-80 and 1980-81. The payments are to be made to ITC in quarterly intervals at dates and in amounts recommended by the Anik B Liaison Committee.

Additional funds have also been obtained from the Department of Employment and Immigration for specific training programs.

11. OTHER ASPECTS

11.1 Licensing

Licence applications were submitted to the CRTC on December 3, 1979 requesting licences on behalf of local broadcasting societies to operate the local television transmitters. Licences were applied for in five of the six ground station communities. (Igloolik has refused TV in their community.) ITC also applied for a network licence to provide up to 16½ hours per week of network programming to these local societies via Anik B.

11.2 Legal, Insurance and Copyright

The Inukshuk Project will oversee the legal and liability aspects of the project. All program material will be the property of ITC or appropriate releases will be obtained by ITC.

11.3 Multiple Project Use of Terminals

Should other projects wish to make use of the ground terminals at the locations identified for this project, we will seek to accomodate such use. However, accomodation of such requirements can only be determined after detailed discussions and provided there is no additional cost to the project. Any use of Inukshuk interface equipment and studio facilities will have to be negotiated on a case-by-case basis.

APPENDIX 1

INUKSHUK SAMPLE PROGRAMMING SCHEDULE

DATE:	2:30-3:45 (Baffin) 1:30-2:45 (Keewatin) 12:30-1:45 (Central Arctic)	3:45-5:00 (Baffin) 2:45-4:00 (Keewatin) 1:45-3:00 (Central Arctic)	6:30-9:30 (Baffin) 5:30-8:30 (Keewatin) 4:30-7:30 (Central Arctic)	9:30-10:30 (Baffin) 8:30-9:30 (Keewatin) 7:30-8:30 (Central Arctic)	10:30-11:00 (Baffin) 9:30-10:00 (Keewatin) 8:30-9:00 (Central Arctic)
Wednesday October 1	Adult Education: Leadership Training for Nunavut Part 1 Broadcast to: homes, small meeting rooms.	Adult Education: Butchering caribou preparation of meat Broadcast to: homes, small meeting room			
Thursday October 2			Meeting: Hamlet & Settlement Councils Topic: improvement of municipal services. Broadcast to: homes, large meeting rooms.	Inuit Television Service: "Saalaumanirq" Inukshuk production 1/2 hr. "Sanavik Co-op" Inukshuk production 1/2 hr.	Reaction/discussion to I.T.S. programming
Friday October 3	Inukshuk staff meeting-re: next week's schedule Broadcast to: small meeting rm.	Old Folks Time Broadcast to: large meeting rooms.			
Monday October 6	School programming "our community"- by Baker Lake students. Broadcast to: schools, small meeting rooms.	School programming Inuit culture series by Frobisher Bay/Qinuaqyuaq Society Broadcast to: schools, small	Meeting: Education Committees & Societies: topic: Inuktitut curriculum development Broadcast to: small meeting rooms,	I.T.S. "Qanaq Greenland" - Nunatsiarmiut production 1/2 hr. "Surusiit"- Nunatsiarmiut production 1/2 hr.	Reaction/discussion to I.T.S. programming

DATE:	2:30-3:45(Bfn) 1:30-2:45(Kwtn) 12:30-1:45(C.A.)	3:45-5:00(Bfn) 2:45-4:00(Kwtn) 1:45-3:00(C.A.)	6:30-9:30(Bfn) 5:30-8:30(Kwtn) 4:30-7:30(C.A.)	9:30-10:30(Bfn) 8:30-9:30(Kwtn) 7:30-8:30(C.A.)	10:30-11:00(Bfn) 9:30-10:00(Kwtn) 8:30-9:00(C.A.)
Wednesday October 8	Adult Education: Leadership Training for Nunavut Part 2 Broadcast to: homes, small meeting rooms.	Adult Education: Consumer Series #1-Consumer Rights Broadcast to: homes, small meeting rooms.			
Thursday October 9			Meeting: Local Land Claim Committees Topic: progress of negotiations. Broadcast to: small meeting rms.	ITS "Eskimo Point" Inukshuk production ½ hr. "Baker Lake Hamlet Day" Inukshuk production ½ hr. Broadcast to: homes, large meeting rooms.	Discussion/ reaction to ITS programming
Friday October 10	Inukshuk staff meeting-re: next week's schedule Broadcast to: small meeting rms.	Radio Societies' meeting. Broadcast to: small meeting rooms.			
Monday October 13	School programming: "Our community"-by Frobisher Bay students. Broadcast to: schools, small meeting rooms.	School programming: Inuit culture series by Frobisher Bay Qinuaqyuaq Society Broadcast to: schools, small meeting rooms.	Discussion: ITC Executive in Frobisher Bay studio - update on ITC - answer questions from communities Broadcast to: large meeting rooms, homes.	ITS: "Ayagarmiut"- PIC-TV production ½ hr. "Nunatini Makimautivut"- "People of Broughton Island" - Nunatsiakmiut productions ½ hr.@ Broadcast to: homes, large meeting rooms.	Discussion/ reaction to ITS programming
Wednesday October 15	Adult Education: Leadership Training for Nunavut Part 3 Broadcast to: homes small meeting rooms.	Adult Education: Consumer Rights Series -#2 Wise buying. Broadcast to: homes, sm. meeting rms.			

DATE:	2:30-3:45(Bfn) 1:30-2:45(Kwtn) 12:30-1:45(C.A.)	3:45-5:00(Bfn) 2:45-4:00(Kwtn) 1:45-3:00(C.A.)	6:30-9:30(Bfn) 5:30-8:30(Kwtn) 4:30-7:30(C.A.)	9:30-10:30(Bfn) 8:30-9:00(Kwtn) 7:30-8:00(C.A.)	10:30-11:00(Bfn) 9:30-10:00(Kwtn) 8:30-9:00(C.A.)
Thursday October 16			Meeting: Hunters & Trappers Association Topic: Game regulation. Broadcast to: small meeting rooms, homes.	ITS: "Kitikmeot Inuit Assoc." Inukshuk Production ½ hour "Central Arctic Area Council" - Inukshuk production ½ hour Broadcast to: homes, large meeting rooms.	Discussion/ reaction to ITS programming
Friday October 17	Inukshuk staff meeting re: next week's schedule Broadcast to: small meeting rooms.	Old Folks Time Broadcast to: large meeting rooms, homes			
Monday October 20	School programming: "Our community" by Cambridge Bay students. Broadcast to: schools, small meeting rooms.	School programming: Inuit culture series by Frobisher Bay Qinuaqyuaq Society Broadcast to: schools, small meeting rooms.	Meeting: Alcohol Committees Topic: prohibition and liquor rationing. Broadcast to: small meeting rooms, homes.	ITS: "Nanook of the North" Robert Flaherty produc. (with voice-over commentory) 1 hr. Broadcast to: homes, large meeting rooms.	Discussion/ reaction to ITS programming
Wednesday October 22	Adult Education: Leadership Training for Nunavut Part 4 Broadcast to: homes, small meeting rooms.	Adult Education: Consumer Rights Series. How to make a complaint. Broadcast to: homes, small meeting rooms.			
Thursday October 23			Meeting: Local Housing Assoc. with Inuit Non-Profit Housing Corp. Officials in Frobisher studio Topic: working relationship. Broadcast to: small meeting rms.	ITS: "Baker Lake" Parts 1 & 2 Inukshuk produc. 1 hr Broadcast to: homes, large meeting rooms	Discussion/ reaction to ITS programming

DATE:	2:30-3:45(Bfn) 1:30-2:45(Kwtn) 12:30-1:45(C.A.)	3:45-5:00(Bfn) 2:45-4:00(Kwtn) 1:45-3:00(C.A.)	6:30-9:30(Bfn) 5:30-8:30(Kwtn) 4:30-7:30(C.A.)	9:30-10:30(Bfn) 8:30-9:00(Kwtn) 7:30-8:00(C.A.)	10:30-11:00(Bfn) 9:30-10:00(Kwtn) 8:30-9:00(C.A.)
Friday October 24	Inukshuk staff meeting re: next week's schedule. Broadcast to: small meeting rooms.	T.V. Societies meeting Broadcast to: small meeting rooms.			
Monday October 27	School programming: "Our community" by Eskimo Point students Broadcast to: schools, small meeting rooms.	School programming: Inuit culture series by Frobisher Bay Qinuaqyuaq Society Broadcast to: schools, small meeting rooms.	Meeting: Local Co-op Boards of Directors. Topic: Management Broadcast to: small meeting rooms.	ITS: "The Peoples' Land" - Hugh Brody production 1 hr.	Discussion/ reaction to ITS programming
Wednesday October 29	Adult Education: Leadership Training for Nunavut Part 5 Broadcast to: homes, small meeting rooms.	Adult Education: Consumer Rights series #4 mail orders Broadcast to: homes, small meeting rooms.			
Thursday October 30			Meeting: Regional Inuit Association Broadcast to: large meeting rooms, homes.	ITS: "Arctic Survival" Parts 1 & 2 Inukshuk production 1 hr. Broadcast to: homes, large meeting rooms.	Discussion/ reaction to ITS programming
Friday October 31	Inukshuk staff meeting re: next week's schedule Broadcast to: small meeting rms.	Old Folk's Time Broadcast to: large meeting rooms, homes.			

APPENDIX B

INFORMATION SOURCES

Academy for Educational Development, Inc.
Applications Management
AID Rural Satellite Program
1414 Twenty-Second Street, N.W.
Washington, D.C. 20037
Telephone: (202) 862-1900

Alternate Media Center
New York University
School of the Arts
144 Bleecker Street
New York, New York 10012
Telephone: (212) 598-3338

Appalachian Community Service Network (ACSN)
1666 Connecticut Avenue, N.W.
Washington, D.C. 20235
Telephone: (202) 673-7866

Public Service Satellite Consortium (PSSC)
1660 L Street, N.W., #907
Washington, D.C. 20036
Telephone: (202) 331-1154

Space Communications Program Office (SCOPO)
Communications Research Centre
Department of Communications
P.O. Box 11490, Station "H"
Ottawa, CANADA
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APPENDIX C

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2. Charles Feaver
   Broadcasting and Social Policy Branch
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3. John Gilbert
   International Telecommunications Branch
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5. Doris Jelly
   Space Communications Program Office
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6. Terry Kerr
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7. Paul Lumsden
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8. John MacDonald
   Social and Cultural Development Division
   Department of Indian and Northern Affairs

9. Alex MacGregor
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10. David Martin
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11. Maureen Matthews
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13. Ron Robbins
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14. Bill Robertson
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15. Dr. Gail Valaskakis
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16. Doug Ward
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THE AUTHOR

The author was Operations Manager of the Inuit Tapirisat of Canada (ITC) three year Anik-B Project "Inukshuk" and was instrumental in the project's conception and planning. Prior to the Anik-B Project she was responsible for carrying out an ITC communications program to improve communications among Inuit communities. Her previous experience includes work as a policy analyst with the Canadian federal Department of Communications. She is currently employed by the National Film Board of Canada.