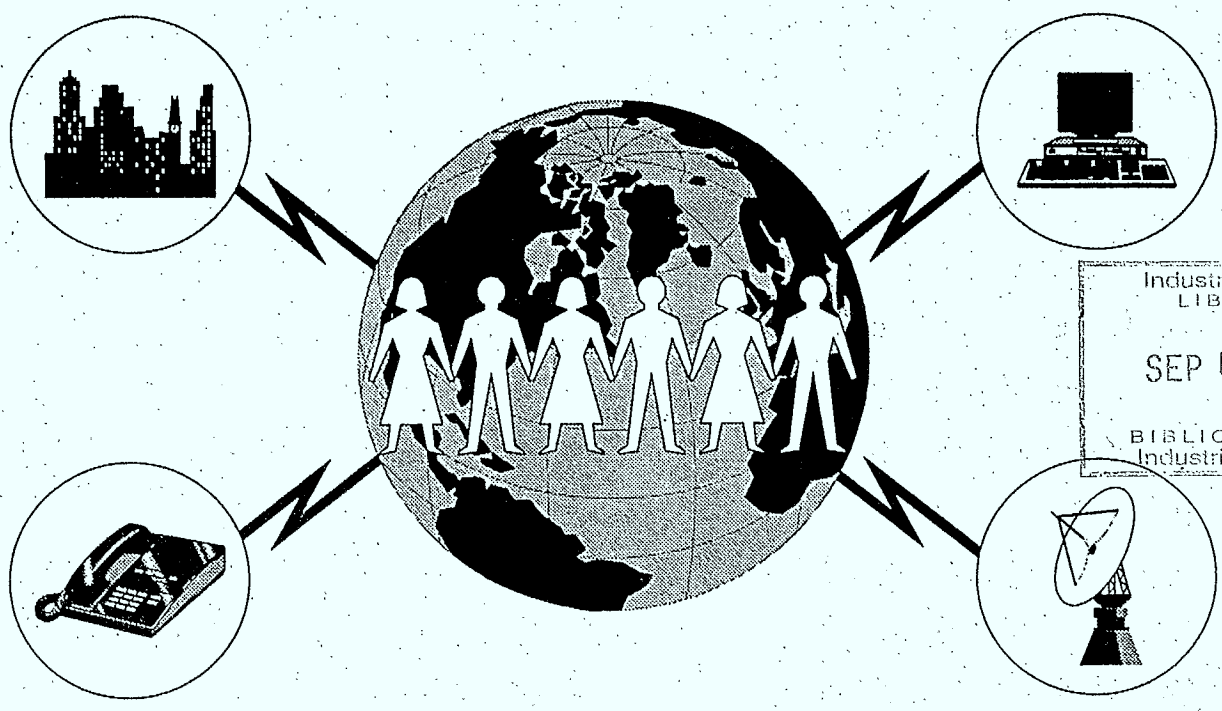
Department of Communications



Evaluation of the Terminal Attachment Program

November, 1992

C&L
The Coopers &Lybrand Consulting Group

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EVALUATION OF THE TERMINAL ATTACHMENT PROGRAM FOR THE DEPARTMENT OF COMMUNICATION

1. Introduction

The Department of Communications, and more specifically the Engineering Programs Branch, retained The Coopers & Lybrand Consulting Group, in May 1992, to conduct a brief evaluation of the Terminal Attachment Program (TAP). The purpose of the review was to provide information to Branch Management on how well the program meets the requirements of participating organizations, and what directional changes may be required to be effective for the balance of the decade. The specific terms of reference called for evaluating:

- the effectiveness and responsiveness of the program in meeting stated objectives;
- the role of DOC as a facilitator among the various stakeholders, as well as the regulator's (CRTC) source of technical support for program development and for the general administration of the program;
- the operation of the program with emphasis on the functioning of the Terminal Attachment Program Advisory Committee (TAPAC).

The review was intended to be retrospective as well as future oriented. The principal objective was to assess how well the Department has discharged its responsibilities for TAP and TAPAC and to identify what directional changes may be necessary in order to meet Canada's terminal attachment requirements in an effective manner during the remainder of this decade.

The scope of the evaluation included:

- over twenty interviews with current and former members of TAPAC (refer to Appendix A for list of names and organizations), representing a cross-section of industry, carriers, associations, and governments. It should be noted that the

individuals interviewed were not randomly selected so that this was not intended to be a "statistically-valid" sample. Rather it was a comprehensive information-gathering exercise with those who have first-hand involvement with the program and TAPAC;

- a brief review of DOC program and laboratory operations;

- a brief environmental scan, covering the US and Europe to identify future scenarios that the program may have to address this decade. This was accomplished by contacting key members of the C&L Telecommunications Consulting Group in the principal countries involved in the scan.

The work was performed under the direction and active participation of our Partner, Mr. John P. Herzog, FCMC, Dr. Richard Clark, Director Information Technology, and John Moore, Senior Manager. The team reported to Dr. R. W. McCaughern, Deputy Director General, Engineering Programs Branch, DOC.

This report presents the results of the evaluation and outlines a number of possible initiatives to improve operations and program relevancy. It may also serve as a discussion paper for a TAPAC meeting to facilitate a more in-depth examination of issues and planning of required actions.

We wish to acknowledge the very substantial effort made by virtually everyone with whom we held in-person or telephone interviews. Invariably, they were well prepared to comment on all aspects of the discussion topics that they had in advance of the interviews (refer to Appendix B for a complete listing), and provided many enriching examples in support of their views.

2. Executive Summary

It is difficult to summarize the wide-ranging exchanges that were completed with representatives of the many participating organizations, including those within DOC, without losing some of the specifics and flavour. However, the following statements against the study objectives offer the highlights:

The Terminal Attachment Program effectively met the objectives for which it was established. Its impact was most significant in the second half of the nineteen-eighties as competition grew in the terminal equipment marketplace and the standards were applied to protect against network harm and meet certain policy goals. Although the efforts of DOC to ensure a balanced representation of views is valued, a significant number of respondents feel that the telecommunications carriers have had undue influence in the setting of standards and that their disclosures are not as open and timely as they might be. This situation may reduce the ability of smaller businesses to compete.

The Department has discharged its duties well as a facilitator and supporter of program development. A senior DOC member chairs TAPAC with great care to ensure a democratic process by providing all participants with opportunities to contribute to the agenda and the development of standards and technical papers. At times this role is particularly onerous when some of the major carriers and manufacturers assume more significant undertakings due to their greater financial and technical resources than the smaller organizations that make up TAPAC. In such cases, both reality and perceptions must be managed adroitly so as not to leave the impression that TAPAC is a vehicle of the carriers. The majority of participants feel that the present Chair has accomplished these aims admirably, although some indicated that the Chair could be more forceful at times to stop the "recycling" of issues.

In addition, through this organizational arrangment, DOC has met its responsibilites to the regulator (CRTC) by providing valuable technical support when such was required.

On balance, the operation of the program is seen to be good, and may be a model for industry/government co-operation. Generally speaking, participants expressed satisfaction with program operations in terms of standards development and dissemination, and equipment certification. However, given the current maturity of the industry and the program, there is considerable room for improvement. By placing more trust in industry and the testing laboratories, the certification process should be accelerated from the current average of four to six weeks. With respect to

the development and issuance of standards, more careful management is required to balance the trade-offs between speedy issue and sufficient technical and commercial research. This should result in a reduction in the number of addenda and changes.

Whilst the majority of comments received were positive, certain senior representatives of important organizations expressed strong views that the carriers have had undue influence on TAPAC proceedings and standards and that the program as well as TAPAC should be concluded in an orderly manner. These individuals suggested that the program and TAPAC have not achieved the goal of providing a "level playing field" for Canadian industry. They attribute it to the pervasive influence of carriers who were allegedly allowed to:

- promulgate essentially their own standards on the industry, allegedly for self-serving purposes;
- influence disclosure procedures so as to keep the timing as short as possible;
- exercise a majority vote at TAPAC meetings.

Therefore they do not consider TAPAC a representative body of the industry, particularly when contrasted with SCOT and the CSA infra-structure. They suggest that TAP and TAPAC be concluded in an orderly manner and that the standard setting responsibilities be transferred to the SCOT that is better organized to deal with them.

The majority of respondents however do not support this position. They point to the fact that the issue has been debated over the last number of years within and outside TAPAC. The TAPAC role was re-enforced in a 1987 CRTC decision (87-519) after the Commission considered comments from some "26 interested parties, most of whom have been involved in the development or applications of these standards..(and)...most of these parties favour TAPAC procedures over those of CSA". Therefore, they favour the continuation of TAP and TAPAC, but raise the need to re-examine their mandate, as described below.

In view of significant technical and industry changes, the future role of TAP requires careful re-examination. As technology moves from analog to digital communications, the concern over network harm is declining progressively. Although opinions varied, most respondents suggested that during this transition period, DOC must continue to be vigilant over the existing analogue networks as well as evolve a new role for TAP and TAPAC in dealing with the speedy emergence of digital networks. Therefore, the future role of TAP and TAPAC should be re-examined in the context of:

- globalization and potential reciprocal certification arrangements among countries;
- growing competition and proliferation of suppliers and carriers;
- the more pervasive issues underlying "interconnect" rather than solely terminal attachment;

- the future needs of the regulator;
- relationships with other standards setting organizations particularly in Canada, North America, and to a lesser extent Europe and elsewhere;
- make-up of TAPAC membership and the development of more formal administrative arrangements to better reflect some of the new realities of the evolving industry and technology.

In short, if TAPAC is to remain viable and relevant, its role and place should be re-examined with a view of developing a revised charter to embrace its responsibilities over existing analogue networks and the transition to digital technology.

A number of suggestions have been identified during the conduct of the review. These are, in random order:

- *The Department should continue to strive to harmonize Canadian standards with those in North America, and progressively in other areas of the world, most notably Europe. This should lead to full reciprocity of equipment certification;*

- *The profile of the certification program should be raised by periodic issue of reminder circulars and by including references in Ministerial speeches;*

- *The mission and mandate of TAP and TAPAC should be re-examined and modified so as to reflect the changing requirements brought on by new technology and business conditions;*

- *The Department should develop a broad vision for the remainder of this decade to help it co-ordinate its policy making role for the various types of interconnect devices (wireless and telephone) in a new world of technology, globalization, de-regulation, and increased competition;*

- *The equipment certification process should be accelerated by providing immediately the required DOC stickers to those companies whose equipment was tested for compliance with TAP standards by DOC approved laboratories and found to have satisfed them. Subsequent test report reviews by DOC should ratify this decision.*

  Where it is noted that, over time, laboratory procedures are not of acceptable quality, laboratories may lose their DOC accreditation. Similarly, where manufacturers/importers do not demonstrate consistent adherence to standards, they may be denied this "fast track" certification privilege.

Approval to place organizations on a "fast track" list, due to their consistent quality performance could be given by TAPAC to ensure impartial treatment. Similarly, TAPAC should ratify the removal of organizations from the list.

- *The Department should develop basic formal frameworks for the key TAPAC administrative processes and ensure that all interested parties are conversant with them;*

- *The Department should make greater use of computer and telecommunications technologies for the preparation and dissemination of standards/certification related information to industry;*

- *and finally, a TAPAC meeting should be organized to develop a longer-term plan that would deal with the foregoing possible initiatives. Sharing the conclusions of this report could serve as a departure point for planning as well as an opportunity to provide the expected feedback to those who made a major contribution to the success of this evaluation.*

  The TAPAC Bulletins, issued by DOC and praised by many participants, may also serve as a vehicle to communicate the resolution of issues raised in this report.

In the next sections, we report in greater detail on the results of the interviews that led to the conclusions summarized above.

3. Program Effectiveness and Relevancy

CONTEXT

Some fifteen years ago, the Terminal Attachment Program was instituted in a co-operative manner by the Department of Communications and a number of telecommunications carriers, manufacturers, provincial authorities, and other interested parties. The stated objectives included the protection of the network from harm, fostering competition within the terminal manufacturing and distribution industry, and providing technical support to the regulator.

In accomplishing these objectives, a critical success factor is that the Department respond promptly to changing conditions and the needs of those directly involved. A number of the discussion topics specifically covered these areas of performance. A synthesis of the responses is provided below.

STANDARDS

Based on the input of the participants, the program's impact on the above listed aims was rated from "good to very good". The standards that were developed were basic, therefore they do not hinder development or stifle competition, and are seen to be in the best interest of everyone.

With the advent of the North American Free Trade Agreement (NAFTA) there is growing emphasis on harmonizing standards with the United States and eventually Mexico. Although some questions exist as to whether such initiatives should be within the purview of the TAP administration, the implications of the undertaking are generally well supported as manufacturers wish to maximize the size of the marketplace where their equipment can function. In fact, there is a desire that a reciprocal arrangement be achieved, whereby the other country's certification would be accepted without subjecting the equipment to a domestic retesting. Harmonization arrangements of this nature should be concluded with the FCC as soon as possible, and eventually with the appropriate European Commission.

It was also noted that most provincial governments have used the standards as a model, thereby reducing duplication of effort and permitting better consistency throughout Canada. Although this is positive, the Department should strive to make telecommunications mandatory standards be in the federal domain exclusively.

ENFORCEMENT

The lack of enforcement capability resulted in the establishment of a "grey market" of uncertified equipment. However, as the purchasing agents of more and more major distributors have become aware of the DOC certification requirement, coupled with more intense vendor competition, the size of this grey market is believed to be diminishing. At the same time, some have argued that with the recent growth of cross-border shopping and the implementation of the Free Trade Act, the market may still become significant.

The majority of respondents believe that any significant investment to curtail the situation would not be cost-effective. Rather, it was suggested that the Department should raise the profile of the certification program with a modest publicity campaign for importers and distributors. This could take the form of specific references to the program by the Minister at speaking occasions and the distribution of a reminder circular from time to time. Some also pointed out that carriers and industry itself could take a more active role in informing the public and those involved in bringing equipment to the marketplace on the need to certify.

The few who expressed concern that the "grey market" could grow or indeed has grown, suggested that the Department already has the power to enforce, and that in conjunction with Revenue Canada, Customs and Excise, should ensure that all equipment that is imported will carry the DOC approval sticker. Should legislation require modification (some will say that it doesn't require any change), then it should be modelled on the related sections of the Radio Communications Act.

COMPETITION

The TAP is seen to have had a positive impact on competition as more and more manufacturers and importers entered and continue to enter the marketplace. However, many feel that there is an advantage to the large manufacturers and carriers as they have a strong influence on terminal standards. Furthermore, although there are guidelines for the lead times to be provided for major and minor new product or service disclosures, the definitions can be subject to interpretation and the notification period is still seen to be not long enough.

Of course it is also argued that in a free-enterprise society, competition is a critical element of technical progress and commercial success, and earlier disclosures could stifle these. A number of successful organizations are of the opinion that the current arrangements are appropriate. They feel that it is incumbent on the entrepreneur to select the right business niche and competitive strategy, rather than rely on regulation-prescribed crutches.

ON THE OTHER HAND

Although by far the majority of comments received credited the program with a good to very good performance, a number of important concerns were also raised. These included:

- the development of "uniquely Canadian standards" is becoming neither a technical nor a commercial necessity, their numbers is excessive, and can create a barrier to the introduction of new devices on the Canadian market;

- there is little public awareness of the need for, and meaning of, DOC certification. This reduces market forces for certification of terminal equipment;

- the lack of any DOC enforcement activity, although the mandate enables the Department to do so (particularly when Bill 62 has passed), is detrimental to the profitability of law-abiding Canadian organizations;

- the recent restructuring of CS-O3 was issued which won general support in industry, although some will suggest that it does not address inter-operability or connectivity, which are becoming more important than network harm;

- carriers are seen to have used TAP as a means of getting their standards implemented Canada-wide thereby benefitting from an unfair advantage. It was suggested that the attendees at TAPAC meetings are mostly carriers and associated manufacturers who can easily sway the vote in their favour.

Whether these comments are founded on reality or perception, the feelings are strong among those who expressed them. Is there a solution? Most respondents acknowledged that these issues do not significantly impair the program and that the continuing support of the major corporations is vital as smaller organizations could not spare adequate technical or financial resources.

A few others suggested that TAP/TAPAC have completed their mission and should be wound up in the next few years. They claim CSA and SCOT or TAC are more relevant for the future of the industry and their structures are better balanced to deal with the development of comprehensive standards. Such positions continue to be maintained by these individuals, notwithstanding previous resolutions and the CRTC order referenced in the Executive Summary.

4. The Role of DOC

CONTEXT

The Department of Communications is performing a number of important roles within its TAP mandate as a facilitator, the regulator's source of technical support, and general administrator of the program. The DOC contribution also includes the operation of a Certification Bureau and a laboratory to develop testing methodologies and perform audit testing. The Department also appoints a Chair to TAPAC and facilitates task forces and working groups.

DOC AS A FACILITATOR

Participants indicated a strong respect for the way TAPAC is being chaired and the democratic approach to have as many participants as possible contribute to its work. This role is seen to be a difficult one that calls for diplomacy, technical experience, and superior facilitation skills. Virtually everyone commented positively on this feature of DOC's role. A few desired that the Chair be more forceful at times to bring issues to a decision rather than re-cycling them to committees.

TAPAC is seen to have provided a very effective opportunity, particularly to smaller organizations, to keep abreast of developments and to network with colleagues in the industry. Opinion varies with the implications of moving the venue of meetings across Canada, and more recently the United States. Of no surprise, those whose regions are being visited welcome the chance to minimize their expenses, while those who have a distance to travel resent it and find the costs exceeding the value to be derived from the meeting. There were also some strong negative feelings about holding meetings in the US. It was felt that only carriers and larger manufacturers and importers can afford the cost and justify it to their management.

Others commented that DOC should develop a broad vision for the balance of the 1990's. The vision should provide a coordinated platform for the administration of both wireless and telephone equipment. It should address how DOC will administer the broader mandate of interconnect as opposed to just terminal attachment, within its departmental mandate under Bill 62, and its relationships with the regulator and other standards setting Canadian (CSA more specifically) and foreign organizations. In fact, many felt that a Federal Department, and DOC specifically, should represent Canadian interests in international negotiations rather than the committee of an Association (such as the CSA).

Finally, a few individuals suggested that DOC should become more pro-active and provide greater leadership as a facilitator to balance the strength of the carriers and related manufacturers.

TAPAC PROCEDURES AND PRACTICES

Most participants were unaware that there were any documented TAPAC procedures. While they were satisfied that the arrangements are informal and relatively "loose", there was a minority consensus that a framework should be established to deal with membership, voting (including use of proxies) and structural arrangements (i.e. task forces and working groups), and meeting proceedings.

Those who advocated this position cautioned against developing anything bureaucratic or very formal as that would be seen as a backward step and could create unnecessary barriers to accomplishing results in a timely fashion.

INFORMATION DISSEMINATION

The openness of the Department to share information was praised. This is very important for all organizations, regardless of size. A suggestion was made to have DOC make greater use of the electronic media and telecommunications facilities to accelerate the dissemination process and potentially even reduce paper burden costs.

The Certification and Engineering Bureau of DOC already has plans to distribute the Terminal Equipment List by electronic means, and other documents may be similarly disseminated given the availability of resources to instal and operate the system.

DOC AS TECHNICAL SUPPORT

The Department was rated as being very good to excellent in providing technical support to Working Groups, industry, and the Regulator. The quality and speed of service were praised, particularly in view of the limited number of resources available in the Department. An interviewee suggested that greater use of testing laboratories may be made in conducting research to support development of standards or when addressing other policy issues.

5. Program Operations

CONTEXT

A critical success factor of any program operation is that it respond promptly to changing conditions and needs of those directly involved. The key performance areas of TAP are the timeliness with which standards are developed and disseminated, responsiveness to the regulator (CRTC) to meet its technical support requirements, as well as to clients to certify their equipment.

DEVELOPING AND ISSUING STANDARDS

Participants strongly endorsed the speed and quality of the standards development and issuance processes and rated them as very good. DOC is seen to provide competent and prompt technical support to TAPAC members as well as to the CRTC. This is particularly noteworthy given the constraints on the level of departmental resourcing.

Some questioned the efficiency of the tri-level committee/task force/working group arrangements. They indicated that this affords several re-iterations of a draft technical position or standard. This can be counter-productive and frequently self-serving for commercial rather than technical reasons, and the process requires close control and monitoring.

Finally, a few commented that the technical quality of the task force members has declined, as some TAPAC member organizations have transferred their support to CSA and SCOT.

EQUIPMENT CERTIFICATION PROCESS

Equipment certification requires between four to six weeks to complete. We understand that this is the best level of service that could be achieved cost-effectively given the resource constraints on the DOC's Clyde Avenue Laboratory and the fee schedule in place for its services. Industry feels that the elapsed time is lengthy, both in absolute terms as it hinders getting the product to the market, as well as in relative terms when compared to the FCC whom many see as processing applications in one week, on average.

Based on our discussion with the FCC, the perception is strictly true, however, the preliminary step by a private bank to receive the mail and cash the cheque accompanying the application may take between two to 7 days which are, in fact, additional to the FCC processing time. Furthermore, it should be noted that the FCC primarily registers the applications rather than verify in-depth the supporting attestations, as is the case in Canada. In the US, compliance with standards tends to be left to the pressures exercised by market forces rather than government.

The approval of private-sector laboratories for equipment testing is particularly well appreciated as a means of speeding up service and fostering commercial opportunities. This fact, coupled with placing a greater trust in the integrity of industry, could allow DOC to certify the equipment on receipt of application/attestation, rather than only after completing the study of the test report. It is felt that there is ample recourse to sanction both the laboratory and the distributor if the quality or validity of the certification process is jeopardised in any way. In fact, some hold that the same logic applies to the possible approval of manufacturers' laboratories for equipment testing.

A brief review of the laboratory administration indicated that orderly procedures are being followed and staff are dedicated to service. There is increasing use of office automation and telecommunications to speed up administrative processes in support of equipment certification and the notification of applicants.

6. The Future Role of TAP/TAPAC

CONTEXT

The rate of change in telecommunications and terminal equipment is rapid and the implications have become global. If the program is to continue effectively, it must be relevant to the specific interest groups it serves and the Canadian public at large. In this context, a number of key influences and developments were discussed with participants

to assess how they may affect TAP and TAPAC and what preparatory steps may need to be undertaken. The following summarize the key drivers and implications.

- **The industry is moving towards digital, wireless networks.** The implications are:

  . The growth of wireless communications using repeaters and cellular technology will lead to wireless office structures. Therefore, it will be more and more difficult to discern "What is a terminal interface?". A comprehensive definition must be developed as soon as possible.

  . As networks are moving to digital from analogue, the possibility of "network harm" is reduced if not altogether eliminated. Therefore the relevancy of the Terminal Attachment Program will decline over time. If it is to remain useful, it should be re-focused from solely network protection to address terminal performance and other regulatory matters with due consideration for the role that market forces could play.

  . Standards development and enforcement will become more complex as networks become more sophisticated with inter-operability on a world scale. It is expected that intelligent networks will interface with intelligent terminals and other networks through the expansion of radio interfaces.

  . The above situation will be exacerbated with the growth of private networks that will place an added burden on maintaining network integrity.

  In summary, technology will evolve over a period of time to a point where the issue of network harm will diminish in importance as more and more networks will be digital. During this transition period, DOC must continue to be vigilant over the existing analogue networks, as well as evolve a new role for TAP and TAPAC in harmony with the industry it serves and for the ultimate benefit of the consumer.

- **Increasing global competition forces industry to have "global" products in order to reduce development, production and operating costs.** The implications are:

  • Pressures on government will continue to increase to achieve harmonization of standards and reciprocity of certification. Once achieved, they should result in a welcomed reduction of duplication of effort, time delays, and costs, including business opportunity costs.

- The need to co-ordinate standards and enforcement activities of the participating countries to ensure that none becomes a "back door" to flood the market of other countries party to the harmonized arrangements. This is particularly important in the context of NAFTA.

- other certification factors such as EMI may become more important than network harm.

These drivers should shape the next five to seven years in Canada and DOC should be ready to respond to the demands by instituting changes to TAP and TAPAC that will accommodate the new realities.

C&L has also contacted its network of telecommunications consultants in various parts of Europe and the United Kingdom in order to obtain input on the future developments in the industry with specific emphasis on terminals and networks and the role of government in setting and enforcing standards. The next section provides a summary of the views obtained.

7. The European Scene

We completed a series of brief consultations with our colleagues in various parts of Europe by referring to a list of questions developed in concert with DOC officials (refer to Appendix C).

THE TERMINAL EQUIPMENT MARKET

In a world telecommunications market of $135+ billion, the U.S. accounts for more than 35%, the European Community (EC) for just under 20%, and Japan for about 11%; no single national market in Europe accounts for more than 6% of the world market. At the present time, about 2% of the European Community gross domestic product results from telecommunications and peripheral activities; in 1986, this amounted to 60 billion ECU (European Currency Units) of an EC GDP of 3,500 billion ECU. However, an annual growth in the telecommunications market of about 7% was predicted for the years 1987 to 1992, compared to an annual growth rate in the GDP of about 2%. It has been estimated that, if the potential for economic growth is not slowed down by barriers to trade and innovation, the telecommunications industry will generate 7% of the EC GDP by the end of the century, and that more than half the employment in the EC will depend to at least some extent on telecommunications technology.

The telecommunications equipment market amounts to a quarter of the annual EC expenditure on telecommunications, with the remaining three-quarters going for

services. Of the 25% spent on equipment, about two-thirds of this, or about $4.5 billion, represents expenditures on terminal equipment, while the remaining one-third is spent on network equipment.

Clearly, this is a time of great change and opportunity for the EC in the area of telecommunications. The economic incentives for all parties to take advantage of this opportunity are enormous.

THE ESTABLISHMENT OF TERMINAL EQUIPMENT TYPE APPROVAL PROCEDURES

Within the European Community, by 1986, both vendors and users of telecommunications products and services had become totally intolerant of the delays, costs and irritation of submitting the same product for approval for attachment to the public telephone network in each EC Member State.

On July 24, 1986, the Commission of the European Community (CEC) issued Directive 86/361/EEC, which related to the initial stage of the mutual recognition of equipment type approval within the EC for telecommunications equipment. Such directives, when adopted by the CEC, have legal status within the Member States; however, it is the responsibility of the telecommunications authority within each Member State to mandate the extent to which each standard must be met within that state.

Summary: This Directive requires that Member States implement recognition of the results of common conformance testing for mass-produced telecommunications terminals, beginning in mid-1987, and sets out a framework of governing rules for this first stage in mutual type-approval recognition.

The Directive required the Commission to establish relevant common conformance specifications, principally in the form of harmonized European standards for terminal attachment called NET's (Norme Européenne de Télécommunications).

The main characteristics of NET's are as follows:

- they are compulsory for public networks;
- they contain the method for measuring compliance; and
- they are subject to a very large preliminary public consultation before being passed.

The NET's were to be defined by the European standards body for telecommunications, which initially was the Conférence Européenne des Postes et Télécommunications, or CEPT.

INITIAL ORGANIZATIONAL ARRANGEMENTS

CEPT was made up of representatives of 26 European public telephone and telecommunications (PTT) administrations. To handle the standardization activity, CEPT set up a working structure based on many private-sector working groups and a coordinating committee named CCH (Comité de Coordination pour l'Harmonisation).

The standards program established by CEPT members was very ambitious. Although a large number of recommendations were produced, it took nearly three years for the first NET compliance certificate to be issued, which was to a U.K. company for a port-sharing device. The network attachment approval for this device was issued by the U.K. Office of Telecommunications on the basis of the NET certificate and other tests for compliance with British safety standards for electrical equipment. In this case, the NET certificate was issued by British Telecom/Teleprove, a division of British Telecommunications PTT and one of 11 testing laboratories in Britain that are accredited and supervised by the British Approval Board for Telecommunications. Most of the attachment approval authorities in Europe are the public telephone companies.

IMPLICATIONS OF THE EUROPEAN FREE TRADE ALLIANCE

The CEPT standardization process was seen by many Member States to be too loose, and not relevant to the needs of the Community and the European Free Trade Alliance. In particular, it was noted that, even if the working structure of CEPT enabled it to work cooperatively with industry and users, the responsibility for the program rested entirely on public administrators and public operators. It was felt necessary, considering the limited technological resources available in Europe, to have all the resources in the private sector, including manufacturers, users, service providers and research bodies, work with the public operators and administrators to achieve the best possible technical results and implement standards that would be acceptable to all parties.

FORMATION OF A NEW STANDARDS INSTITUTE

On January 15, 1988, a new standards institute replaced CEPT. The European Telecommunications Standards Institute, or ETSI, established its headquarters in Nice, Italy. As an autonomous organization, ETSI is funded by its members, and through income from contracts for the provision of services. As of 1990, ETSI had 137 members representing the leading European telecommunications interests. There are 20

countries represented in ETSI, with some countries which were represented in CEPT not yet having joined ETSI.

A few of the interesting organizational aspects of ETSI are as follows:

- ETSI is permitted to recruit staff and enter into contractual arrangements for the provision of services;

- any European organization concerned with telecommunications can become a member of ETSI, including:

  - national administrations
  - public network operators
  - manufacturers
  - users, including private-sector service providers offering services to the public
  - research bodies;

- ETSI has three primary fields of interest:

  - telecommunications
  - the overlap between information technology and telecommunications technology, and hence in the standards relevant to these technologies, often referred to as a "grey zone"
  - the overlap between broadcasting/radio communications technology and telecommu-nications technology, often referred to as a second "grey zone";

- the working structure of ETSI consists of two types of groups, Technical Committees and Project Teams. Technical Committees are composed of experts, and can involve participants who are not members of ETSI. They provide a forum for concensus building on draft standards to be submitted to the Technical Assembly, the highest authority within ETSI for the production and approval of standards. Each Technical Committee meets periodically and is specialized in a specific area.

  The Project Teams are groups of specialists who carry out studies and prepare draft standards to be examined by the Technical Committees. Each Project Team works under the guidance of a Technical Committee. The Technical Committees create new Project Teams as required, and provide their mandates;

- ETSI permits observers to its proceedings, who must contribute 1,000 ECU (European Currency Units) per year for the privilege. Observer status may be granted to European organizations who may or may not be entitled to become

members of ETSI. Non-European organizations concerned with telecommunications may be invited to participate as observers at no charge.

- ETSI common costs are shared by Member States on a scale which relates to the size of the country. The largest countries pay a share that is fifty times the amount paid by the smallest countries. The common costs in fiscal year 1989 amounted to 2.5 million ECU.

- The major cost component is the work program connected with the activities of the Project Teams, which amounted to about 4 million ECU in fiscal year 1989. This is funded by all members of ETSI, with a level of contribution selected by members on the basis of an approved list of parameters.

- ETSI Member States are required to use published standards, where available, for type-approval purposes, and to notify the Institute of relevant approval authorities and approved testing laboratories within their countries. A procedure is included for Member States to suspend recognition of particular conformance specifications which appear inadequate.

GOVERNMENTAL PARTICIPATION

The terminal attachment program within the European Community is a complex one. EC telecommunications policy is based on significant government intervention in mandating technical standards in order to ensure a single market for terminals and services across the Community.

This is reflected in EC legislation establishing:

- open competitive supply markets for terminals and most services;

- a common regime and harmonized standards for terminal attachment approvals; and

- harmonized specifications, availability and access terms for public networks (called the Open Network Provision, or ONP).

This legislation is mainly in the form of directives which are binding on EC member states to implement within their own regulatory structures.

KEY DIRECTIVES AND DIRECTIONS

Following summaries show two relevant directives -- one on EC attachment approval and one on ONP -- which increasingly will drive which network attachments must be harmonized. Note that there is little progress yet on EC harmonized standards for analog telephone network access. Harmonized terminal attachment activity is still in transition from the 1986 approach to the current process which aims at harmonized attachment standards, harmonized laboratory accreditation, and full mutual recognition of type-approval certificates across the Community.

Council Directive of April 1991 on the approximation of the laws of the Member States concerning telecommunications terminal equipment, including the mutual recognition of their conformity (91/263/EEC)

Legal status: Adopted.

Summary This Directive establishes Community-wide procedures for conformance testing of telecommunications terminals to harmonized specifications, and requires Member States to ensure that terminals for use with public networks may be marketed or put into service only if compliant with such requirements, and not to impede the marketing or use of compliant terminals. Appropriate national authorities for type approval will be required to recognize a certificate of conformity to relevant specifications issued by a notified testing body of another Member State. The implementation of this Directive is required by the end of 1992, when it will effectively replace the provisions of the first-stage Directive on type approval.

Essential requirements to be satisfied by terminals include:

- safety and radio interference aspects;
- protection of the public network;
- interworking of the terminal with the network for connection control; and
- interworking between terminals, in certain cases.

The Directive lays down a procedure and consultation process to be followed by the Institute in designating and publishing relevant harmonized standards and technical regulations for compliance (CTR's, or Common Technical Regulations, to supersede the NET's of the first-phase scheme) -- assisted by an Approval Committee for Telecommunications Equipment, ACTE, to be made up of Member State

representatives, particularly their regulatory approval authorities. Provision is also made for transitional use of national standards (with territorial restrictions) prior to the availability of harmonized standards for particular terminal types.

The Directive establishes criteria to be met by independent testing bodies, and procedures for the designation by Member States of qualified testing bodies and their notification to the Community. Conformance assessment procedures are defined, covering both equipment type examination and certification, and manufacturing quality assurance. Provision is included for full quality assurance of a manufacturer's design, manufacture, final inspection and testing capabilities, permitting self-declaration of product conformance by such approved and notified organizations.

The ACTE by May 1992 had called for 18 required CTR's to cover interfaces for various leased line types; network access for public data networks; ISDN; digital mobile networks; and digital telephony over ISDN, digital mobile networks. The schedule for development of relevant technical specifications by ETSI Technical Committees runs to mid-1994.

Council Directive of June 28, 1990 on the establishment of the internal market for telecommunications services through the implementation of open network provision (ONP) (90/387/EEC)

Legal status: Adopted.

Summary This Directive provides for the harmonization of open access and usage conditions across the relevant public networks and services in Member States; it does not apply to satellite communications at present. This framework envisages harmonized conditions with regard to:

- technical/interface characteristics (including a time schedule for implementation in all Member States);
- non-discriminatory supply terms and permitted usage conditions; and
- tariff principles.

The ONP approach is aimed at encouraging the development of value-added and other telecommunications services in the Community through:

- ensuring that telecommunications organizations make available appropriate leased lines and basic public services in a timely and consistent fashion on a Community-wide basis;

- requiring that technical interfaces and service features for attached terminals are subject to European standards; and

- prescribing anti-competitive conditions which might restrict, in particular, the use of these services in the private provision of enhanced services to third parties.

A staged definition of ONP conditions for specific public networks and services is envisaged through a planned series of subsequent directives and recommendations, some of which are specified for the period ending December 1992. These will include leased lines and voice telephony service (via directives) plus packet-switched data services, and include ISDN conditions (initially via recommendations).

This framework directive also establishes the characteristics of potential conditions for open supply and usage, and the procedures and consultation processes to be followed by the Commission in preparing ONP legislation. Member States are required to notify the Commission of the operators (granted special rights for public networks or services) which are to be designated as telecommunications organizations for the requirements of ONP.

IMPORTANT LINKAGES WITH CANADA

Following is a summary of those Committees which are concerned with activities covered by the Canadian TAPAC.

ACTE — Approvals Committee for Terminal Equipment. Advises EC Commission (i.e., the civil service) on standards required in the Euro terminal attachment approvals process. Members are Member State representatives (particularly of national approvals bodies); the Committee is chaired by the Commission.

ETSI — European Telecommunications Standards Institute. Responsible through technical committees for writing and publishing European standards. ETSI is the EC-sponsored successor to CEPT technical committees; it also co-ordinates EC development for CCITT recommendations. Membership in ETSI is open to public network operators and others (for example, equipment suppliers) so both may be represented on standards committees.

TRAC — Telecommunications Regulations Applications Committee of ETSI. Endorses ETSI standards as Common Technical Regulations, which are the designated standards for the Euro terminal attachment approvals process.

Members are national delegates representing regulatory and approvals bodies.

ONP — ONP Consultation and Co-ordination Platform. Part of the required ONP consultative process. Membership is completely open, but represents designated interest groups: public operators, other service providers, equipment manufacturers, business users, residential users. The Platform's goals include providing a forum for discussion of views and issues, identifying common positions, presenting views and positions to the Commission and its ONP Committee (of national government delegates). Working groups may be established to cover particular technical or other topics.

The Platform relates directly to network interface issues, rather than attachment approval; currently there is no equivalent industry forum established for consultation, for example by ACTE.

THE FUTURE FOR TERMINAL ATTACHMENT PROGRAMS AND STANDARDS IN THE EUROPEAN COMMUNITY

The Commission of the European Communities has been moving strongly toward the elimination of government-sanctioned monopolies in telecommunications except in the provision of the basic infrastructure and ordinary voice telephone service. The remainder of the telecommunications marketplace will be open to free competition among multiple suppliers. The Commission has mandated safeguards designed to ensure that all participants in the competitive marketplace will have a fair opportunity to compete against the offerings of the telecommunications administrations. One key safeguard is the set of principles for Open Network Provision. The legal avenues that the Commission should follow in enforcing the safeguards are currently the subject of controversy within the EC; the resolution of that controversy may affect the pace with which the Commission can establish a single European market in telecommunications.

IMPLICATIONS FOR CANADA FOR THE BALANCE OF THE 1990'S

1. Over the past ten years, a number of new forces have overtaken the world telecommunications market, forcing leading telecommunications nations to evolve a number of traditional views of the role of government in establishing and enforcing standards. One force is the advent of diverse new kinds of telecommunications services and equipment which has made it difficult to determine the proper scope of the historically-state-sanctioned monopolies. Another is the effect of technological advances in making competition feasible in areas where monopoly provision may have made more sense in the past. Still another is the growing appreciation at the

political level of the benefits that competition in an open marketplace can bring to users. Since telecommunications technology is becoming a most-important tool of other industries, those benefits have the potential to bring more competitiveness to all areas of business. This reinforces the need for Canada, like other world telecommunications leaders such as the U.S., Japan and the European Community, to continue to address the roles of TAP and TAPAC in light of the evolving world scene.

2. It has become apparent that, more and more, market forces are being allowed to dictate the sanctioning of terminal equipment suppliers whose products fail to meet compliance standards. There is absolutely no question that technical and performance standards for such equipment are, and will continue to be, necessary. However, the U.S., in keeping with its general trend toward de-regulation, appears to be moving in a direction that will lead to more standards, and more stringent standards, while encouraging more self-regulation in line with market forces.

   One possible outcome of this trend is that equipment certification could become optional for suppliers. There is even the possibility that the current FCC certification process could be abandoned by the end of the decade. Clearly, world-wide realities underscore the need to re-examine the potential on-going requirement for TAPAC certification process, and include in the deliberation the possible scenario of phasing it out, in an orderly fashion, say by the end of this century.

3. To preserve and enhance Canada's position in the world telecommunications market, there is a need for a more broadly-based standards setting body at which DOC must be an observer. This would in no way reduce the role of DOC as a provider of technical support to the Regulator. While the European Community's ETSI has had startup jitters and growing pains, and continues to evolve as the Community stabilizes, it is working and appears to be growing in effectiveness. With Canada's Terminal Attachment Program and related infrastructure now clearly approaching a transition phase, the CEPT/ETSI evolution may offer certain features for Canada to examine and possibly adapt in terms of the way in which the EC has made the successful transition from state administration control of the telecommunications industry to having a standards-setting body with an arms-length relation with government.

4. There are a number of immediate and pressing issues which need to be addressed over the next five to seven years by TAPAC or the organization into which TAPAC evolves.

   - While the original TAP/TAPAC mandate was related to the most basic terminal devices plugged directly into the telephone company's wall jack, today's technological environment is far more complex, and must deal with

devices that are far removed from the wall plug, and often involve the convergence of telecommunications and computer technologies. With many small businesses and even homes now chaining computer fax/fax-modem cards, telephone/fax switches, telephones and telephone answering machines together, it becomes essential for TAP/TAPAC to address all the "grey zones" in the digital world.

- Electronic Data Interchange (EDI), Electronic Funds Transfer (EFT) and electronic mail system interconnect requirements are raising the need for higher-level application protocols. Who should be setting the standards for these protocols?

- Many new technologies such as spread-spectrum wireless LAN's, the interconnection of RF-based modems, and the integration of hand-held cellular phones with paging systems employing RF signalling, are demanding a new mapping of the RF spectrum. As these technologies converge with those of computers and telecommunications, TAPAC may need to determine the extent to which it has a role to play.

- Last but certainly not least, there are international trade pressures brought about by the various common market agreements being concluded such as the US/Canada Free Trade Act, the more recently signed North American Free Trade Agreement that also embraces Mexico (and the interest being expressed by Australia and New Zealand to join) and the Uruguay Talks focused on South America. These agreements exert pressures on making telecommunications equipment compatible amongst the countries. At the same time, the manufacturers are aiming at serving global markets not just domestic. For this to be financially viable further underscores the need for common international standards amongst the signatories of the trade agreements.

5. As a world leader in telecommunications technology, Canada must take advantage of opportunities to lead in the formation of, and participate in, those national and international bodies which will establish the standards for global harmonization over the next decade. As a minimum starting point, Canada must forge strong links with ETSI, and start to participate actively in the projects being initiated by this organization.

8. Conclusion

This report summarizes a brief review of the effectiveness and operation of the Terminal Attachment Program of the Department of Communications. It also provides the highlights of discussions held with various members of the Telecommunications practice of Coopers & Lybrand in Europe. These conversations focused on the key aspects of the current situtation and future scenarios for terminal attachment standards.

We are grateful to everyone we interviewed as they contributed a wealth of information and experience to the preparation of this report. We also appreciate the collaboration of Departmental executives at Headquarters and the Clyde Avenue Laboratory who provided the support necessary for us to conclude this work and present our findings objectively.

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APPENDIX I

LIST OF INTERVIEWEES

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Chuck Berestecky
Manager
Mandatory Product Standards
AT&T

Victor L.F. Boersma
Directeur-Adjoint
Relations Commerciales
Northern Telecom

Dan Braden
President
Association of Competitive Telecommunications Suppliers
and
Executive Director
Competitive Telecommunications Association (CTA)

Mr. Cheeseman
Manager
Alberta Government Telephones

Bob Corey
Head Methods Testing and Standards Development
Department of Communications

Dave Dalmage
Vice President
Certelecom Laboratories

Harry Dulmage
President
Certelecom Laboratories

E.J. Exton
Director, Standards
Telecom Canada

Terry Gill
Supervising Engineer,
Terminal & Interface Standards
B.C. Telephone Company

Mr. Ken Holt
Director
Certification and Engineering Bureau

Syd Horne
(Retired - ex Nothern Telecom)

Pierre Jasmin
Manager
Department of Communications

Lloyd V. Kubis
Vice-President
Motorola Canada Limited

Jim Lafrenière
Manager, Telecom Equipment Approval
Certificationa dn Engineering Bureau
Communications Canada

Ken Lees
KCL Enterprises

Henry Mar
Standards Engineer
Department of Communications

M. Messier
Conseiller
Direction des politiques de télécommunication
Ministère des Communications
(meeting also attended by A. Bordeleau)

B.M. (Bernie) Murphy
Senior Advisor - Standards Policy
Telecom Canada

Leo Nikkari
Director, Industry Liaison
Unitel Communications Inc.
(meeting also attended by Mr. Mr. Beaty)

D. Paul
Director
Corporate Standards & Engineering
Bell Canada

Barry Reed
Director, Technical Analysis
CRTC

Keith Richardson
Assistant Vice President, Standards
Mitel

P.J. (Phil) Saunders
Director, Commercial Relations
Northern Telecom

Robert C. Simmonds
Vice-President, Technology
Lenbrook Inc.

F. Vitek
Technical Advisor
BC Government - Ministry of Regional & Economic Development

E.M. Wade
President
DCE Communication Consultants Ltd.

John Watson
EEMAC

Dr. Jacek J. Wojcik
President
Aprel Inc.

APPENDIX II

DISCUSSION TOPICS

DISCUSSION TOPICS
TERMINAL ATTACHMENT PROGRAM (TAP)

Thank you for participating in the TAP review. Please take a few minutes to consider the following questions in order to focus our discussion and make optimum use of your time.

Some fifteen year ago, the Terminal Attachment Program was instituted in a co-operative manner by the Department of Communications and a number of telecommunications carriers, manufacturers, provincial authorities and other interested parties.

Throughout this discussion guide you will note that we have highlighted statements about the TAP program. Please read each statement, then answer each question as it relates to this statement. Print your response in the corresponding space, or circle the rating that best reflects your opinion. (Note: E = Excellent, VG = Very Good. G = Good. NI = Needs Improvement and P = Poor)

1. Based on your understanding, please list the key objectives of the program and circle the appropriate level to correspond to the extent that the objective has been satisfied.

   a) _____ E VG G NI P

   b) _____ E VG G NI P

   c) _____ E VG G NI P

   d) _____ E VG G NI P

2. Your opinion of the program's impact on:

   a) Competition within the terminal manufacturing/ distribution industry ..... E VG G NI P

   b) Equipment connectivity and development ..... E VG G NI P

   c) Adherence to the requirements ..... E VG G NI P

   d) Telecom carriers' operations and services ..... E VG G NI P

   e) The telecom regulatory activities of provincial governments ..... E VG G NI P

   f) Other (please specify) _____ E VG G NI P

A critical success factor of any program operation is that it respond promptly to changing conditions and needs of those directly involved.

3. In your opinion, how well is TAP responding to the following (circle the appropriate level).

a) Timeliness in developing mandatory standards ..... E VG G NI P

b) Timeliness in issuing mandatory standards ..... E VG G NI P

c) Responsiveness to CRTC (regulator) to meet its technical support requirements ..... E VG G NI P

d) Responsiveness to clients to certify equipment ..... E VG G NI P

e) Other (please specify) _____ E VG G NI P

The Department of Communications is performing a number of important roles within its TAP mandate as a facilitator, Regulator's source of technical support, and general program administrative duties.

4. Please provide examples of each these roles and an assessment of how well DOC discharges it.

a) Facilitator (please specify) _____ E VG G NI P

b) Regulator's technical support (please specify) _____ E VG G NI P

c) Program administrator (please specify) _____ E VG G NI P

d) Other (please specify) _____ E VG G NI P

The Departmental contribution to the program includes the operation of a Certification Bureau and a facility to develop testing methodologies and perform audit testing (while it also performs certification testing for the public, this is in the order of 1% of the certification testing). The Department also facilitates the meetings of various committees (e.g. TAPAC), task forces, and working groups.

5. What is your assessment of the Department's performance in these and related activities?

	E	VG	G	NI	P
a) Certification and Engineering Bureau	E	VG	G	NI	P
b) Equipment Approval Unit	E	VG	G	NI	P
c) TAPAC	E	VG	G	NI	P
d) Task Forces (please specify) _____	E	VG	G	NI	P
e) Working Group (please specify) _____	E	VG	G	NI	P
f) Other (please specify) _____	E	VG	G	NI	P

6. Please comment on the effectiveness and efficiency of TAPAC with respect to each of the following. Where possible, please provide an example to illustrate your comments.

a) Information Networking

_____

_____

_____

b) TAP Support (ie., administrative and technical)

_____

_____

_____

c) TAPAC procedures and practices

d) Other

The rate of change in telecommunications and terminal equipment is rapid and the implications have become global. TAP must take these factors into consideration and must be both reactive in a timely fashion as well as proactive in providing leadership to ensure that Canada maintains its leading edge in high-technology. Within the context of TAP, please respond to the following questions.

7. In your opinion, what are the 3 key influences (waves) that you expect to change the telecommunications industry in the next 10 years?

8. Please elaborate on each of the initiatives that should be undertaken in light of these influences (as listed under Question 7).

9. In your view, what are the implications of these influences and initiatives (as listed under Questions 7 and 8) for TAP?

10. In your opinion, what other opportunities should be seized at this time to improve the effectiveness of the program or the way it is administered?

11. Do you have any other thoughts on how any aspects of current operations may be improved?

Thank you for taking time to jot down your thoughts. Please have this document ready for the follow-up discussion.