

Report of the Communications Research Advisory Board 1980-81

Canada

COMMUNICATIONS

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Government of Canada
Department of Communications

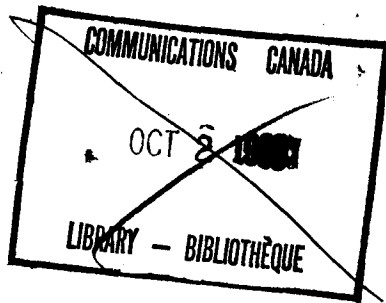
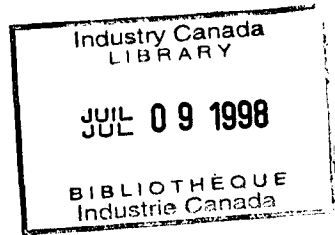
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Preface

The annual report of the Communications Research Advisory Board (CRAB) is made public in the interest of promoting a greater understanding of the issues involved in publicly funded communications research in Canada.

The Communications Research Advisory Board (CRAB) was appointed in 1974 to advise on the research program of the federal Department of Communications. Its members, distinguished experts in the fields related to communications, are appointed by the department for terms not normally exceeding three years.

The mandate of the Board is to advise the Department of Communications on the quality, management, and relevance of its research program to departmental goals. It also recommends measures to improve co-ordination with similar programs in industry, universities, and elsewhere in government, and offers advice on matters specifically referred to it by the department.

May 1, 1981

Mr. Pierre Juneau
Deputy Minister
Department of Communications
Ottawa, Ontario

Dear Mr. Juneau:

On behalf of the members of the Communications Research Advisory Board I have the honour to submit the report of the Board for 1980.

Communications in all its facets is fundamental to Canada's future growth and prosperity. It is a privilege therefore to be given the opportunity to address in some small part the increasingly complex issues that face the Department. Without the extraordinary cooperation of my colleagues the task of the preparation of this report would have been impossible.

On behalf of the Board I would like to express my appreciation to you and the many members of the Department for the comprehensive set of briefings given to us regarding the nature and extent of the activities of the Research Section and the related concerns of the Department.

Yours sincerely,

A handwritten signature in black ink, appearing to be 'T.R. Ide', written in a cursive style with a large, sweeping underline.

T.R. Ide
Chairman
Communications Research
Advisory Board

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1

Picking a winner

At a time of slow economic growth in Western countries, many observers remain perplexed by the strong performance of the electronics/communications industry. As noted by the OECD,

“... by far the ripest and most pervasive technology of the late 1970s is electronics.”¹

The emergence of microelectronic circuitry, the marriage of computers and communications and the advent of new transmission technologies such as fibre optics and satellites combine to present major industrial opportunities. Some of these opportunities are possibly best captured in Figure 1, which illustrates what is happening around the TV set where most of us get our information and entertainment.

Entrepreneurs are responding to the challenges and opportunities presented by emerging communications technologies, and firms in this sector are growing rapidly. A recent survey² of ten Canadian electronics firms has shown that:

- they are producing skilled employment at a compounded growth rate of 38 percent compared to a national average of 3 per cent;
- their prices are dropping rapidly because of the application of cost-reducing technological changes; and
- they export some 50 per cent of their output.

¹OECD, *Technical Change and Economic Policy*, (Paris 1980), p. 55.

²Toronto Stock Exchange, “Nothing Ventured. . .”, (1980), p. 29.

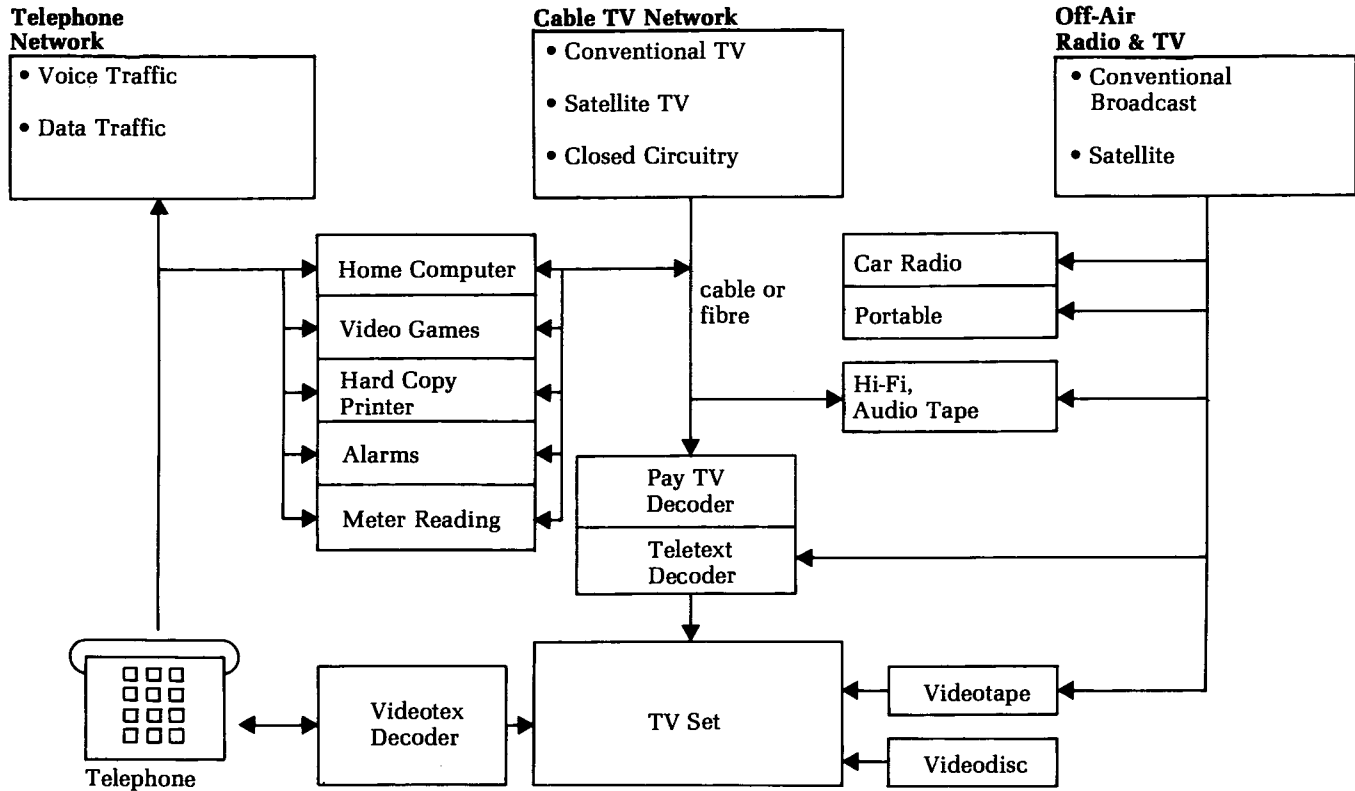


Figure 1 - New Information/Entertainment

It is not surprising then to find the industrialized countries setting in place policies and strategies using the total array of instruments available to governments – subsidies, tax incentives, regulation, purchasing and research – to support and protect this growth sector.

The focal point in Canada for the development of policies and strategies for communications is the Department of Communications (DOC). Pressure on DOC to set policies is increasing not only because of the rapid development of new communications technologies but also because of the issues related to the content delivered to Canadians through these technologies. By bringing the federal responsibilities for Arts and Culture under DOC, the Government has recognized that new policies regarding content can no longer be assessed in isolation from the technological delivery system. In the words of the Deputy Minister:

“Not only does this move (i.e. bringing the Arts and Culture within DOC) recognize the economic importance of the cultural sector, but it emphasizes the social importance of our communications networks, which are rapidly becoming the nation’s pre-eminent cultural delivery system.”³

We welcome this marriage of content and technology because it will permit the Department to develop policies in a more comprehensive way. While CRAB’s primary responsibility is to review and make recommendations on DOC’s scientific research program, we have had from time to time to raise issues that relate to content. The recently established Federal Cultural Policy Review Committee is the proper focus for discussion of such issues and we hope that we will be able to develop a close relationship with that Committee. In this way we will be able to serve DOC more effectively.

There is now a consensus in Canada that communications, in its broadest sense, provides a major industrial opportunity for the 1980s; it’s a winner! This places DOC at centre stage in policy development across a full spectrum of activities ranging from research to the stimulation of our cultural industries.

³Pierre Juneau, “The Music Industry in Transition”; Notes for and Address to the RPM Conference of Broadcasting and Record Industries on the Occasion of the Sixteenth JUNO awards, February 5th, 1981.

2

DOC and strategic planning

We have, in previous reports, stressed in various ways the importance of planning and the need for DOC to set in place a comprehensive planning process. We consider this a matter needing urgent attention if the communications sector is to realize its opportunities for Canada. A focus to deal in a systematic way with the plethora of issues facing the Department* is badly needed. Since the fruits of research appear only after a long gestation period (usually in the order of a decade), directions for research must be viewed within a comprehensive planning perspective aimed at achieving longer-term objectives. Budgetary constraints and the growing number and complexity of issues are major factors which must be considered and which provide a context within which priorities are set. However, these concerns must be balanced against the potential long-term material benefits which could accrue as the result of planning. Planning is a creative as well as logical process.

*The DM identified, during the CRAB meeting of Nov. 17, 1980, four kinds of issues that relate to DOC's mandate:

- 1) *Industrial policy issues* (e.g. financing of R&D, the role of the "chosen" instrument, industrial scenarios for specific projects such as Telidon)
- 2) *Regulatory issues* (e.g. ownership of earth stations, Canada/U.S. satellite communications, carriage versus content, interconnection, deregulation)
- 3) *Software issues* (e.g. financing of TV production, economics of providing information, government as information provider, future of sound recordings and video-discs)
- 4) *Social issues* (e.g. privacy, access to information, diversity of sources, identity and sense of belonging, sovereignty and independence).

No organization, large or small, public or private, can be a continued success without embodying an active planning function. This function can take many forms and must be custom designed to work for the management culture in each organization. The larger and more complex the internal and external environment of an organization, the greater the need for formal, professional strategic planning processes.

It is the responsibility of senior management to do strategic planning. The decision-making task cannot be delegated. Senior management and senior management alone has to set the strategic mission of an organization. Equally essential is to enunciate objectives and provide leadership in achieving the objectives through explicit strategies. The act of planning has to be built into the culture of the organization. No paper system really works unless it is either developing an organizational culture or is supportive of an existing one.

The formal strategic planning processes are important to management in the setting of objectives and guiding strategies in response to a changing external environment. The second major role is to assure that the internal and external communication of objectives and guiding strategies results in the implementation of programs which reflect the original intent of senior management.

The information/communications industry is becoming the most important growth business in the world. Clearly defined, constructive and consistent support by DOC can play a vital role in shaping the Canadian opportunities in this industry. Although strategic planning is the responsibility of senior management, this does not mean that a support structure is not needed. On the contrary, it is essential.

In 1978 the Communications Research Advisory Board proposed a planning position. In 1979 the board was gratified to learn of the establishment of a Planning Secretariat. Now the positions are vacant. We recommend the appointment of someone with a documented and clearly successful background in strategic planning who will have overall responsibility for the function within the department, report directly to the Deputy Minister, and be a member of the Senior Management Committee. Qualified individuals are not easy to find, but are essential if synergy within the diverse areas of DOC is to be achieved. The performance of the Secretariat in dealing with complex issues is key to the execution of DOC's mandate to foster the orderly development of communications in Canada.

3

Four areas needing immediate attention

While anyone charged with the responsibility for strategic planning would have to deal with all of DOC's activities, we believe that there are four areas that need immediate attention. These four areas present a number of issues that highlight the need for strategic planning.

Telidon

The development of Telidon technology is an outstanding DOC success story. In a very short space of time, Telidon has been recognized as one of only three world videotex standards, and generally accepted as superior internationally. At least ten Telidon trials are in progress in Canada. Sales have been made in the U.S.A. and Venezuela, and are being developed elsewhere.

The Government announced February 6th 1981, that \$27.5 million in new funds will be injected into the Telidon program* to bring this technology into the domestic and worldwide marketplace. This is a very welcome and much needed vote of confidence in a unique Canadian venture. This commitment by the Government presents a major challenge to both governments and industry. The next major task is transferring Telidon technology from Government to the private sector so that the system and its applications can be aggressively marketed.

*The increased federal funding will be used for a number of activities which are listed in the Appendix.

Telidon is a classic case of a technology developed within a government laboratory whose mission is not principally commercial. Cordell and Gilmour noted in their study of technology transfer from government laboratories to the manufacturing sector:

“As long as most R&D establishments lack the mandate to work in direct support of manufacturing, technology transfer from one to the other will remain as it is now: tangential, instead of central, to the work of the R&D establishment; relatively limited in occurrence; and confronted by many difficulties. Compared to this single factor all other impediments to the transfer of technology to manufacturing are trivial.”⁴

Work on Telidon technology began around 1969 to meet a computer-aided design requirement for the CRC Space Program. The technology has now evolved to the point where wider commercial applications are perceived. By asking industry to pick up the challenge of commercializing Telidon, DOC must at the same time move the technology into an organization so as to ensure that maximum benefits accrue to Canadians and Canadian enterprises. There are various forms that a commercial organization could take. For example, it could be a “chosen instrument” analogous to SPAR in the space sector, or even a consortium of interested firms with DOC as a partner.

Once Telidon is established within a viable commercial framework, the following key issues would then be properly addressed:

a) Telidon is not, in reality, a ‘product’ in the traditional sense of the word. It is, rather, a concept: a communications protocol. As a result, Telidon hardware can be manufactured by anyone anywhere who has sufficient initiative and investment. There is nothing sufficiently secret about Telidon and its picture description instructions (PDIs) to prevent foreign manufacturers from entering the race to produce low-cost, efficient terminals. Canada’s challenge, therefore, is to establish production lines for these terminals faster and more efficiently than others. That can only be done in the very time period when Telidon’s market acceptance as a videotex system is still not known. So the risk for Canadian manufacturers is considerable.

b) Since Telidon is a concept, rather than a product per se, it is critically important that the research that went into the establishment of Telidon as a world standard be continued. Videotex is still an evolving technology. If it is to be an integrating technology with applications in both the home and business, much more research will have to be done. CRAB therefore feels that research activity related to Telidon must be continued and expanded, not only in DOC but in the private sector as well. For example, there needs to be a simplification in the access

⁴A.J. Cordell and J. Gilmour, *The Role and Function of Government Laboratories and the Transfer of Technology to the Manufacturing Sector*, Science Council of Canada; Background Study No. 35, (1976), p. 240.

protocols so as not to overburden the user with complicated "decision-trees" before gaining access to information.

c) Telidon faces exceedingly stiff competition from the British and French videotex systems, notwithstanding Canada's technical superiority. In each case where Telidon has been sold to a foreign customer, it has been sold against lower-cost hardware, and has succeeded because it is perceived as a superior technology, and because customers believe that user terminal costs will fall by a factor of five or six within two to three years. *If that price drop does not occur, Telidon will lose out internationally.* This means that research into the manufacture of Telidon "chips" will be required.

d) The key to low user-terminal prices is volume production. An international consultant (Butler Cox and Partners, London) estimates that in quantities of 100,000 Telidon terminals will cost \$290 U.S., just \$25 more than the far inferior British terminal. At that price, Telidon has a realistic opportunity to be accepted by regulation and in the market place as the de facto, and single, world standard. So the goal of any strategy must be aimed at volume production. Unless it is volume production in Canada by Canadian manufacturers, the benefits to this country probably will be lost.

e) The principal battleground for the world's videotex systems is the United States. Virtually all industry participants and observers agree that whichever videotex standard the U.S. market selects will not only be the pre-eminent world system, but will also be the system used in Canada as well. That is a crucial point: our own country must be preserved as Telidon territory, if we are to gain the benefits resulting from winning the marketing battle in the United States.

f) Telidon relies for its success on three key attributes, compared to the British and French systems:

- it offers superior graphics capability;
- it offers greater flexibility – with both downward and upward compatibility in terms of future developments; and
- it offers lower storage and transmission costs, since, in effect, it compresses more data into less space.

Of the three, graphics superiority is at present most important. But there is a catch: no one knows whether superior graphics capability is vital to the process of turning videotex from an experiment to a mass market medium. So a prospective purchaser of Telidon seeks evidence – in Canada – that Telidon's attributes are demonstrably more useful to the consumer. Demonstration of the multiple uses of Telidon must be central to a marketing strategy.

g) Demonstration of such "reference accounts" is a problem. Despite announcements of ten or more Telidon trials or services, actual experience is limited to a few demonstration databases, such as DOC,

Infomart, TVOntario and a limited number of functioning production systems, such as the MTS Project Ida. The total number of terminals in use is still minimal, the number of information providers and pages very limited, and the software to demonstrate the system's full capability is not yet operational.

h) Basically, Telidon faces a "chicken-and-egg" situation in Canada. A videotex system needs a volume of varied and attractive content supplied by information providers in order to attract users and impress Telidon customers. But an information provider demands an audience before he will invest the necessary dollars in content. At the present time, the progress is slow and Telidon's credibility is threatened in the hotly competitive world market. The decision to match the industry's contribution of 6,000 terminals was an important decision (see Appendix) which should help overcome the inevitable initial inertia.

Space program

There are a number of concerns arising from developments taking place in the space sector, particularly in the field of communications satellites. One is the perceived need for a space agency or space council to co-ordinate the activities of the various government departments which are currently planning 19 separate space activities in the five-year plan for 1981 to 1986. In our 1979 report, we recommended that the Government of Canada, in consultation with industry, examine the issue of a more co-ordinated effort in order to provide a focus for Canada's space activities. We are pleased to note that such a review is presently underway under the aegis of the Ministry of State for Science and Technology (MOSST). The organizational foci being reviewed are:

- a department reporting to a Minister which remains close to user departments;
- MOSST itself;
- a division of NRC; and
- a separate corporate form.

While we are not in a position to recommend a specific organizational structure, we believe that the proper form would have to meet the following criteria:

- authority to finance projects
- focal point for the coordination of Canada's space effort, including user involvement
- market driven (thus private sector involvement)
- catalyst for the development and exploitation of new technologies
- focal point for government to government interaction
- focal point for defence/security consideration
- focal point for procurement

From these criteria it is evident that we favour an organizational form that has both public and private sector involvement. Such a structure would help to minimize overlapping responsibilities for

satellite operation among various government departments and agencies. For instance, a key factor in the evolution of Canada's space program are decisions by the Canadian Radio-television and Telecommunications Commission (CRTC), the agency responsible for allocating licenses for broadcast services involving Canada's satellite system. At the same time, responsibility for managing the system rests with Telesat Canada, which is owned jointly by the Government of Canada and the Canadian telecommunications carriers. Given the present diffusion of responsibility, there is concern that Canada's leadership in the satellite field will falter, with devastating consequences to our space industry and to our inventory of professional and technical competence. We are encouraged by the ambitious space program planned by DOC for the next few years, but we caution that the success or failure of the program will depend on dynamic and sustained leadership, particularly in view of the many conflicting demands on federal government expenditures in a time of general restraint on spending.

Another concern relates to the problems associated with communications satellites, particularly in the field of direct broadcasting. Keen competition is emerging among western nations for orbital positions in space and in the development of domestic and regional satellite systems, and there is a worldwide controversy over the options open for satellite systems and the issue of access to them. Some of these issues will be resolved at the 1983 Broadcasting Satellite Regional Administrative Radio Conference (RARC).

Some countries, such as the United States, allow several competing agencies to operate their own communications satellites. Other countries have consolidated responsibility for the operations and ownership of satellites within one agency, such as Telesat Canada.

However, satellite transmissions are indifferent to national borders. Crucial decisions regarding the use and reception of these transmissions have yet to be made. In the U.S.A., for example, the Federal Communications Commission (FCC) is now considering proposals that will exploit direct broadcast satellite (DBS) technology. There will be far-reaching implications for Canada. For instance, Comsat has applied to the FCC for permission to establish high power direct broadcast satellites whose transmissions would cover much of Canada's most populated regions. If the FCC approves Comsat's bid, many questions would arise relating to the reception of these signals in Canada.

While we encourage the extensive efforts that DOC is making in the field of direct broadcast satellites, we caution that the nature of the demand in Canada for direct-to-home broadcast services utilizing low cost earth stations has not been established. Small low cost earth terminals imply high cost satellites. Arthur D. Little, for example, in a study commissioned by Comsat estimated that where no competitive (e.g. Pay-TV) services are available, then Comsat could expect 2.5 million subscribers. Using the one-tenth rule for Canada the economic

viability of DBS for this country becomes doubtful. However, further study will be needed to confirm this for the Canadian environment.

However, given Canada's enhanced capacity to design and build low power satellites with spot-beam application, operating on the 14/12 GHz bands, the industrial and export opportunities in DBS technology appear to be exciting, particularly in Third World countries where the bulk of export markets for DBS systems can be anticipated.

Given Canada's relatively small population, it is difficult to find an economic rationale for arguing that satellite operators other than Telesat Canada should be licensed to operate satellite systems in Canada. However, Telesat Canada is under considerable pressure from present and potential satellite users to widen access to Canada's satellite system, both technically and through changes in tariff rates. The Minister of Communications has already broadened ownership provisions for the licensing of television receive-only terminals (TVROs). The Minister has also announced a more general review of satellite earth station policy with the possibility of extending TVRO licensing to certain categories of applicants who are not now eligible, and the Department is also examining licensing procedures for certain specialized service areas, such as weather broadcast services and scientific uses. In addition, in order to ensure that Canadian satellite capacity will be available for specialized satellite services such as the transmission of business data, DOC is undertaking technical studies to ensure that Canada can meet Canadian demand via Canadian satellites. We endorse this effort in view of the fact that competition from American satellites, (e.g. Satellite Business Systems, launched in late 1980), will generate pressures in Canada to gain access to American satellites if similar services are not available nationally.

Finally, a continuing area of concern is the whole concept of the "designated or chosen instrument" approach to developing a space industry in Canada and the issue of industrial loading with respect to Spar Aerospace Products Limited. These issues must be viewed in the context of the history of Spar's emergence as a Canadian prime spacecraft contractor. There are certain fundamental principles which were part and parcel of Spar's decision in 1977 to acquire the Canadian space and electronics operations of RCA and Northern Telecom Limited under conditions which, were it not for these fundamental assumptions, would have been unfavourable from a business viewpoint.

The first of these principles was that the strategy would be to concentrate on payload development (an RCA strength) and to license spacecraft busses. This led directly to the decision to join the European Large Satellite (L-SAT) program and to contribute to it in a meaningful way. A second fundamental principle was the expectation that the Multipurpose Satellite (MUSAT) program would go ahead and provide sufficient loading for the company to justify making the necessary investment in acquiring RCA and Northern Telecom Limited.

In fact, the MUSAT program has not materialized. The strategy of concentrating on payload and licensing the busses is, in our opinion, a good opening strategy and should be continued. The competitive advantages will be in the payloads, to a far greater extent. In order to be considered seriously as a prime contractor, however, Spar must have access to a spacecraft bus and its supporting technology. The L-SAT bus is a good choice. It fills a different market niche from the Hughes (HS-376) bus upon which the Anik satellites are based (and to which Spar also has limited access) in that it has twice the payload capacity and the capability to handle 4 KW of power with growth potential to 8 KW. The commercial factors surrounding the L-SAT bus appear favourable, and Canada should expect to benefit from participation in the long run. Failure to support the L-SAT program, in view of the large delays in MUSAT, would result in industrial loading which will be insufficient to sustain a domestic prime contractor. To question the prime contractor approach and its associated industrial loading commitments now is academic. That decision (which we believe to be correct) was made in 1977. For these reasons, CRAB recommends continued support of Canadian participation in the L-SAT program.

Also CRAB recommends Canadian participation in the up-coming MSAT "mobile" satellite program with the U.S.A. since it gives the carriers the only chance to get a satellite mobile service trial at 800 MHz in preparation for the second generation "mobile" satellite systems of the 1980s.

Regulatory issues

While regulatory issues may not appear to be a major concern of the research sector, the research component becomes evident when these issues are cast within the context of long-term strategic planning. The ability to set regulations is being outpaced by the rapid advancement of communications technology. Therefore, the research sector must provide the technical information on which sound policies and appropriate regulations can be based.

The areas of particular concern, revealed during this year's briefings, relate principally to transborder data flow, liberalization of terminal attachment practices, carriage versus content, balance in programming, pay television, extension of services, control over earth stations, the use of satellites for broadcasting purposes and the relationship of Telesat with the Trans-Canada Telephone System (TCTS). The regulatory issues related to radio systems in general and land mobile radio in particular referred to in Chapter 4 are prime examples of the relationship between research, regulations and policies.

The presence or absence of national objectives in communications within the DOC cuts across the essence of its planning, research and policy development functions. Key regulatory issues cannot be researched effectively without a distinct awareness of national purpose in the communications sector. Effective departmental planning

in communications cannot be performed without an explicit appreciation of the federal and provincial ground-rules underpinning communications matters in Canada. CRAB acknowledges the various factors that make it difficult to develop national policies but believes that there needs to be a reappraisal of DOC's policy setting procedures and the need to set in place a new strategy for meeting present regulations and policy requirements.

Although broad spectrum political agreement on the control over communications cannot be expected to come soon or easily, CRAB recommends that, because serious harm will be caused by further delay in the process, an explicit working statement of national purpose in communications be formulated by DOC using the framework of existing constitutional arrangements. When this is done — and it must be done soon — many consequences beneficial to Canada and to Canadians will follow, not the least of which will be the ability of DOC to plan, research and recommend policy across the full sweep of its mandate. Revised communications legislation is urgently required.

Telecommunications standards

Technical and administrative standards are needed in the telecommunications industry to enable the efficient connection and interworking of equipment owned by various administrations. Although some extremely good work has been done in the past on the subject of standards, standards evolved slowly.

With the world about to add significantly to the capabilities of its telecommunications networks, standards are about to become a much more important issue than they have been in the past. Decisions will have to be made more quickly than has been the case in the past and many more factors will have to be taken into consideration.

Since DOC is the focal point for telecommunications standards activities in Canada, CRAB recommends that more resources should be applied to this activity in a planned fashion over the next few years to enable a faster pace of setting standards. Care should be taken to attract sufficient talent to this activity to be able to contribute technically as well as in a business sense. Close liaison with Canadian industry on these matters is essential to the long term viability of this industry both in its Canadian market and in its ability to export profitably.

4

Other issues related to the research program

CRAB has received a comprehensive briefing on DOC's research program. On reviewing the material, we felt that we should highlight certain concerns rather than attempting to comment on all aspects of the program.

As well as the four items presented in the previous section for immediate action, we feel that the following areas also need special attention.

Reviewing the role of research in radio technology and systems

The Communications Research Centre (CRC) has an exemplary record of research in radio technology and systems that has brought international acclaim to Canada. There have been many contributions to original scientific knowledge. Telidon affords a recent and striking demonstration of this vitality. Concerned that this performance be sustained, the members of CRAB pose the question: Do the commitment and resources exist to maintain the level of excellence that has been the hallmark of this laboratory in past decades?

There is a need for the Department to redefine the purpose and role of research in these areas for the 1980s. What should it do and whom should it serve? In the absence of a clear vision of its role, there will be a tendency for research to drift in response to the availability of funds from the government for particular programs.

While providing security in the short run, this can be detrimental to the long term future of the activities. We believe that the role of CRC should be that of a national centre for communications excellence and

that it should undertake programs and projects that are consonant with this concept.

There are two broad directions of research that should be pursued: (a) mission related research, and (b) research for industrial development. Before commenting on these thrusts, it is necessary to stress that a balance in effort and resource allocation is needed to address these two tasks. Both require a commitment to generate new ideas and projects in the laboratory so that the effort is not solely imitative or developmental.

There are constraining factors that may inhibit the output of original work and the pursuit of scientific excellence. Fiscal restraints and the emphasis of the federal government on envelope planning and budgeting, with industrial benefits as the criterion for funding, are dictating which technical projects are to be undertaken. There is a danger that this emphasis and these control mechanisms can divert attention from new projects. Moreover, in the absence of the creativity that is associated with original work, there is no source of ideas for future exploitation and to serve as an attraction for bright young scientific minds to be drawn to CRC.

A case can be made that it is a legitimate function of a government laboratory to have discretionary resources and freedom of choice to investigate promising directions for research where industrial or commercial returns are not the end requirement. This work can put Canada on the map at the leading edge of technology, as did Telidon, and by the quality of research act as a magnet for cooperative work with leading universities or scientific centres in other countries.

We therefore recommend that about 15 percent of the total budget for radio technology and systems research be reserved for this purpose.

Mission Related Research

A valuable service to the federal government can be provided by undertaking special research projects and giving expert advice where important regulatory, procurement, or policy decisions have to be made.

- **Regulations Support** – The Department of Communications is responsible for the management of the radio spectrum. The development of frequency plans and spacing arrangements for compatible services is an integral part of this activity. The expertise of the laboratory in the field of propagation can be used to advantage in this work. As an example, there is a fairly comprehensive depth of understanding of radio signal propagation in the ionosphere and high frequency radio as a medium of communication for international services and domestic service to the Canadian north. A means to improved performance is by computerized spectrum management and control techniques already developed in the laboratory. The radio technology and systems groups should receive support for continued work in this area.

There is a need for the capability of these groups to be developed and used to assist the Department in planning of telecommunications networks and systems for efficient spectrum use and least economic cost. The point has been reached where opening up new portions of the spectrum is a less viable option. Instead, there must be a more efficient use of technology to use existing frequency bands more effectively. Technical resources should be available to address this emerging need.

- Procurement Decisions – A strong radar capability has been maintained at CRC from the time it was the Defence Research Telecommunications Establishment, with one of its prime functions being to serve the research and development needs of the Department of National Defence (DND).

There are many indications that expenditures on defence will be increased substantially in the 1980s both in Canada and the United States. Opportunities with excellent commercial prospects should arise and it is essential that R&D in radar systems technology not diminish if advantage is to be taken of procurements by the Department of National Defence and the U.S. Department of Defense. Special efforts should be made to ensure that the results of the R&D work are conveyed to industry by periodic seminars and briefings.

Massive procurements totalling \$200 million or more in radar systems are also forecast to satisfy the air and marine requirements of Transport Canada in this decade. The competition for the supply of equipment will be fierce and the federal government will be faced with the major task of ensuring that maximum benefits to Canadian industry flow from these procurements.

The research activity at CRC on radar systems should be oriented to these major opportunities and the development of a Canadian capability to meet domestic requirements. The procurements of DND and Transport Canada are sufficient not only to establish a strong Canadian industrial base but also to set the stage for the export of our radar products. The Department of Communications should be vigorously supporting the development of this base when the allotment of funds in the Economic and Defence envelopes are made for the operational requirements of DND and Transport Canada.

- Policy Development – The Department will be making policy decisions in emerging fields of technology that must receive attention in the radio technology and systems groups. Such areas include semi-conductors or integrated circuit research, and information processing systems, including the software necessary for their control and operation. There is work underway in fibre optics – the key technology for future transmission systems.

The management of the Department of Communications may wish to assure itself that sufficient resources are dedicated in CRC to keep abreast of or participate in research into these topics so that informed advice is available for policy decisions. This may mean abandonment of activities on projects in older technologies to ensure that resources are transferred to emerging technologies.

Research for Industrial Development

The radio technology and systems groups can play an important role in programs of support for industry. The advantages of this involvement with industry are:

- the successful transfer to industry of research originated in the laboratory provides a natural outlet for ideas, and economic rationale to justify the costs of continuing research;
- there are promising research projects at the leading edge of technology that are too risky for Canadian companies to take on without assistance;
- it is the small Canadian companies that require "seeding" and their support by CRC can be very helpful;
- other programs of support such as those operated by the Department of Industry, Trade and Commerce are commercially oriented and companies may not be able to demonstrate in the early phases of research that the intended products can be marketed for profit;
- contact with industry will provide a source of ideas and relevance to the selection of new research projects in the laboratory.

Principles will need to be established to ensure that support for industry is well directed. Some considerations for developing an approach might include:

- prior consultation with industry to determine what topics and projects should be undertaken before research is initiated;
- co-ordination with the Department of Industry, Trade and Commerce, Ministry of State for Science and Technology and National Research Council to reconcile research initiatives with strategies of support for the electronics industry;
- commitment to farm out work to industry and to transfer in-house technology to industry at the earliest time for commercial development;
- program parameters that are flexible and responsive to industry requirements;
- a reporting system that shows the effectiveness of the placement and application of the support funds.

The case of land mobile radio systems

Mobile radio is one of the fastest growing technologies today, world-wide. Everywhere, people on the move are demanding that they be able to communicate with one another at any time, anywhere. This is not a trivial desire. It has become a primary ingredient in the efficient use of a nation's human and material resources, particularly its non-renewable resources. Japan recognizes this and has advanced mobile systems both on trial and in use. So does Finland.

In Canada too, government, industry and users all acknowledge the inevitability of what we must do as a nation with mobile radio over the next couple of decades. But implementation in Canada is badly bogged down in a mass of legalistic debate, an inclination to study the issues interminably in a search for the perfect system, and an inadequately funded research and development base from which to draw

strength in this rapidly changing science. Canada's mobile planning is in serious trouble because policy in several key areas is vague, uncertain and incomplete.

Mobile Radio Policy

We urge that government policy on the future of mobile radio telecommunications in Canada, guided by the impressive library of scientific, industry, and user recommendations submitted to the DOC over the past several years, be made public without any further delay.

Specifically, resolution of domestic licensing policy for the all important mobile allocations in the 400 MHz and 800 MHz bands is long overdue. Granted, certain elements of such policy had to await the outcome of the World Administrative Radio Conference-1979 (WARC-79) world frequency allocation tables. But, for almost two years prior to that, extensive industry and user participation while helping the DOC formulate Canada's positions for WARC-79, identified in large measure agreed-to mobile system concepts to the year 2000. DOC's failure to have a complementary sub-allocation plan ready for post WARC-79 domestic licensing policy has seriously inhibited industry investment and has lost Canada valuable implementation lead time.

Finally, we are dismayed to learn that yet another round of DOC "Discussion Papers" on the future of Canadian mobile systems at 400 MHz and 800 MHz is now contemplated. After almost five years of intensive examination of these issues, we cannot afford another delay of four to twelve months.

Mobile Radio Research and Development

Research at CRC is absolutely essential to the development of mobile radio in Canada. Activity in this field is presently at an alarmingly low level considering the work that needs to be done, particularly in the area of research support to the spectrum policy and spectrum management sectors where expert opinions in new modulation technology, propagation characteristics and interference criteria are of ever increasing importance.

- We strongly recommend that the CRC's mobile radio research program be strengthened and adequately funded, starting immediately. Further, we think it unwise that research activities are being carried out from time to time in other sectors of the department where the orientation is clearly operational.
- We also recommend that coordination between the CRC and other sectors and departments active in mobile matters be assured. This is especially important at the present time since the Department of Industry, Trade and Commerce is seeking a "world product mandate" from a multinational firm to develop mobile systems.

Failure to quickly resolve mobile policy issues may cost Canada the opportunity to manufacture and export the new advanced mobile systems needed here and in the rest of the world. It is acknowledged that the development of a Canadian land mobile radio manufacturing

base to serve Canadians can only succeed if it also meets similar needs elsewhere in the world.

- The new high capacity mobile systems at 800 MHz are designed to ultimately serve all of North America. They will be fully compatible between Canada and the U.S.A. and, in the foreseeable future, primary terrestrial systems will merge with satellite facilities (MSAT) to access hard to reach remote and rural regions. Canada must exploit this opportunity to manufacture and sell into the U.S. market. It has been pointed out to DOC that Canada's competitive edge can lie in a more versatile product with unique Canadian enhancements such as data and facsimile.

- A new medium capacity, fully automatic public mobile telephone system at 400 MHz is a unique Canadian concept developed by the Canadian common carriers. Designed to meet Canada's need for a medium capacity "national system" it is also particularly well suited to the requirements of many less developed nations where the problems of serving large sparsely populated areas, over great distances, are similar to our own. The system has competitive advantages of being contemporary, unique in the world market, and available quickly at a competitive price if manufacturing economies of scale are assured. A prototype system is fully operational in Winnipeg, and others are expected to be in service soon in Vancouver and the B.C. lower mainland and in Alberta where a province-wide system is planned. These are very courageous initiatives because, although the concept and its spectrum requirement was first described to the DOC in 1976 and subsequently reviewed many times, there is still no clear policy that guarantees they will ever be part of a larger system. Others across Canada, carriers, manufacturers and users, are holding back for this same reason.

Policy at 400 MHz, stating the licensing criteria, and reserving and clearing, where necessary, the required blocks of frequencies for a nationally compatible system is urgently required.

- We must emphasize that Canada is not faced with a choice between 400 or 800 MHz mobile radio system development. Both systems are needed.

- The development of land mobile "complete systems" should not be done at the expense of "sub-system" development. The CRC in 1978, and again in 1980, attracted world-wide interest with major breakthroughs in voice conditioning equipment for land fixed and mobile systems (SYNCOMPEX) and with a fully automatic channel evaluation sub-system for use in high frequency radio systems (RACE). Since both devices are believed to have large export potential, we are concerned to find that their final trial and development may be curtailed for lack of funds. We recommend that this work be continued with adequate funding and that these products be tested in the export market as soon as possible.

The mobile radio competition from well established American, Japanese, and Central European exporters will be formidable. The competitive position, particularly in the less developed nations, may

finally come down in some cases to how we are seen in related international activities.

- Canada is highly respected for its expertise and leadership in the international radio standards bodies of the International Telecommunication Union (ITU). Participation in these and other, emerging, international forums must be maintained and strengthened and supported with adequate funds.

The promise of office communications systems

Electronic office technology is evolving away from independent machinery performing specific functions and towards the integration of these individual pieces of equipment into systems. The equipment suppliers which will ultimately reap the benefits of this "office revolution" will be those who are capable of marketing the complete system.

The Canadian electronics industry has developed internationally competitive products, technology, and marketing capability. Indeed, the world's largest selling word processor and the world's largest selling line of private telephone exchanges are manufactured by Canadian companies. However, the small size and specialized orientation of these firms limit their ability to move beyond the manufacture of individual pieces of equipment to the production and sale of complete systems. As market demand shifts in this direction, the corporate resources required to sustain a systems capability will increase and domestic firms could find themselves forced into small market niches or into being "subcontractors" to the system suppliers.

To ensure a more firmly rooted stance in the market, the Ministers of DOC and IT&C have jointly sponsored the Office Communications Systems Program. It has two main elements. First, it will establish a program office within DOC to draft the technical standards which will enable companies to design equipment which will connect to and work with the equipment of other manufacturers. Second, the program will provide the means by which field trials of electronic office systems can be carried out in government departments.

To accomplish these objectives, \$1 million has been budgeted for 1980-81 and \$1.5 million for 1981-82. After this initial phase, a requirement for a further \$9 million is foreseen. These direct expenditures will be complemented by expenditures of \$32 million through existing government programs and through normal office equipment procurement.

It is important to note that the purpose of the program extends beyond simple specifications development and field trials. Although the government is spending money for these purposes, they are not the ultimate goals. The program will succeed by providing the stimulus for a number of diverse firms to work together, leading to the capability to produce the required systems. This has already begun to happen: there have been some tentative relationships formed between both independent Canadian firms and some Canadian subsidiaries of multinationals. The program pulls companies together, points them toward a common marketing objective, and gives them some of the

tools to reach it. Individual company projects along the way, if they qualify under program terms, will continue to be financed by IT&C's Enterprise Development Program.

It must be stressed that it is the initiative of the individual companies that will determine the success of the program and Canada's ultimate presence in the "office of the future". The firms themselves must decide to work together, must take the necessary risks, and must penetrate a market which will continue to grow whether or not Canadian companies participate in it.

The need for a focus for component development

The briefing by CRC staff included the fact that an investment is being made by DOC together with DND to further the state of gallium arsenide device technology in Canada. This technology investment is strongly endorsed by CRAB as being a key area of high technology of considerable future importance to both departments and to the Canadian high technology industries. These new microelectronic and electro-optical devices represent a key technology in the development of the next generation of advanced radar systems, satellite communications systems, telecommunications systems, data processing systems, and instrumentation. The all pervasive use of electronic systems in fulfilling federal government departmental missions make it essential that the availability of key microelectronic components of such systems should continue to be available in Canada. To make these devices the materials must be very pure and prepared under carefully controlled conditions because the limitations of device performance are in general associated with the presence of undesirable impurities and other imperfections.

Such advanced devices will always be used where the considerable operational advantage that can be attained is worth the deficiencies of supply, i.e., high cost, irregular deliveries, dubious quality. The supply from foreign sources is irregular and the quality non-uniform. Canada has the necessary technical and material resources to develop the high performance devices needed for such specialized purposes. However, no one department of the federal government has a clear responsibility for coordination and for ensuring the availability through Canadian sources of devices essential to Canada's needs.

It is recommended that staff of the Communications Research Centre of DOC, should jointly, with R&D staff of DND, initiate action to form an interdepartmental working committee on microelectronic and electro-optic components and materials. It is proposed that this committee should be along the lines of the Electronic Component Research and Development Committee (ECRDC) which was so successful in the 1950s and terminated in the 1960s.

5

Conclusions and recommendations

DOC is a key actor in steering Canada through the next stage of the information/communications revolution in this decade. Others will take their lead from the policies developed by the Department. Because the formulation of such policies is so crucial we urge, once again, that a comprehensive strategic planning process be instituted at the most senior level within the department and recommend;

“the appointment of someone with a documented and clearly successful background in strategic planning who will have overall responsibility for the function within the department, report directly to the Deputy Minister and be a member of the Senior Management Committee.”

We appreciate the difficulties of setting in place such a process and finding the right individual as strategic planner, but we firmly believe that this one recommendation needs to be accepted and implemented if our other concerns are to be dealt with adequately.

Our other major concerns are reflected in the following recommendations:

1 Telidon technology should be established in a viable commercial framework at the earliest possible date;

2 DOC's research activity related to Telidon technology must be continued and expanded along the lines described in this report to support the private sector's marketing and R&D activities;

- 3** The Space Program should be situated as soon as possible in a separate organization which has both public and private sector involvement;
- 4** There should be continued support of Canadian participation in the European L-SAT program;
- 5** Canada should participate in the up-coming MSAT "mobile" satellite program with the U.S.A.;
- 6** An explicit working statement of national purpose in communications should be formulated as a framework for policy planning and research;
- 7** The new communications legislation should be tabled before Parliament at the earliest possible date;
- 8** Resources applied to research in telecommunications standards should be increased in a planned fashion over the next few years; special emphasis should be placed on research in support of radio systems regulations;
- 9** The purpose and role of research in radio technology and systems should be reviewed and redefined to meet the challenges and opportunities of the 1980s;
- 10** The Communications Research Centre should be viewed as a national centre for communications excellence and undertake programs and projects consonant with this theme;
- 11** Some 15 percent of the budget for research in radio technology and systems should be for fundamental research;
- 12** The research activity at the Communications Research Centre on radar systems should be oriented towards up-coming major procurement opportunities and the development of a Canadian capability to meet domestic requirements;
- 13** Government policy on the future of mobile radio telecommunications should be made public without further delay;
- 14** Research on mobile radio systems should be strengthened; we think it unwise for research activities to be carried out from time to time in parts of the department where the orientation is clearly operational;
- 15** Coordination between the Communications Research Centre and other sectors and departments active in mobile matters should be assured;

16 Research work on the SYNCOMPEX and RACE systems should be continued at an adequate level;

17 Canadian participation in the International Telecommunication Union and other international forums must be maintained and strengthened;

18 Canadian industry must be encouraged to work with government in the area of Office Communications;

19 A DOC/DND Interdepartmental Committee should be established to bring much needed attention to the problems of advanced component development.

These are the areas which we have identified as needing particular attention at the present time. They highlight the breadth of DOC's mandate, the need for a strategic planning context to guide the research effort, and the importance of having a significant degree of private sector involvement in the development of the research activity.

Appendix

The funding for the Telidon program will be used for:

- The manufacture of about 6,000 Telidon terminals in the next year to be loaned to industrial concerns for start of operational systems or conduct of market trials, subject to their purchase of at least an equal number and to the advantages offered in their proposals for employment of the terminals;
- Product research and development to further develop the Telidon technology, reduce the price and expand the capabilities. Examples include completion of the development of the VLSI (very large scale integrated) low cost terminals, captioning for the deaf adaptors, person-to-person communications hardware and improved software;
- Up front support for certain important national and international Telidon systems, including a national broadcast teletext service in both languages;
- Support for market development and standards;
- Support for public interest initiatives to permit disadvantaged groups lacking resources – minorities, disabled, consumers – to exploit the Telidon potential as a communications medium.



Deputy Minister of Communications

Sous-ministre des Communications

Ottawa K1A 0C8

Mr. T. R. Ide
Chairman
Communications Research
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Dear Mr. Ide:

I took great pleasure in reading your first report as Chairman of the Communications Research Advisory Board.

You have carried on the tradition of advising the Department freely and frankly on the quality and relevance of its Research Program. I am particularly pleased with the effort made to relate the Research Program to the Department's planning and policy functions, as well as to the newly added Arts and Culture Program.

With respect to Arts and Culture, I am gratified to note your support for the decision to bring this responsibility under the jurisdiction of the Department of Communications. Indeed, content can no longer be treated in isolation from technology. Our record in communications technology has been consistently one of world leadership in the research, development and engineering of new information delivery systems. However, we face a challenge of a different type in the production and marketing of information itself. In order to deal better with this situation, I have recently authorized the allocation of additional resources to content research. By bringing social and technical researchers closer together, we are trying to provide the synergy needed to ensure that content delivery systems effectively serve and are compatible with the fundamental needs of our society.

I found it very timely that CRAB has selected strategic planning as the main theme for its 1980 report. I recognize the need for more coherent policies and clearer strategies, and believe the Department must work from broad objectives toward specific operational plans. In

practice, the need to deal with day-to-day problems may make it difficult to achieve a fully-articulated strategy in the short term. Nevertheless, our policy is to work toward a coherent set of programs, and I hope that you would agree with me that the department has been very creative in the relatively short time that has elapsed since its inception. Although DOC was one of the first departments to organize a Planning Sector in the early 70s, it was forced to revise its approach, largely because of its constantly changing environment, in favour of one which consists largely in developing as quickly as possible the particular policies appropriate for each new situation. At present, the Department's Planning Secretariat is inoperative. Before appointing someone who will have overall responsibility for the planning function within the Department, I will review this matter thoroughly with my Senior Management Committee.

I would now like to address each of your specific recommendations in the order that they were made in your report.

Telidon

As you have so appropriately stated in the report, there is now a consensus in Canada that communications, in its broadest sense, provides a major industrial opportunity for the 1980s.

My number one priority is to make Telidon a success. In addition to obtaining funds and developing a strategy for a Canadian and world marketing policy, this requires us to develop the strongest possible organizational structure and to obtain co-operation from other federal government departments and the provinces.

We definitely plan to have industry assume primary responsibility for the future exploitation of Telidon technology. For that purpose, Cabinet has directed the Minister of Communications to pursue ongoing discussions with industry to develop a commercial framework.

Given the number of discussants, both in industry and government, it is difficult to predict the precise form in which the different program elements will be transferred from DOC to the private sector. But we are fully aware of the urgent need for decisions. Now that the standards issue in North America seems to be resolved in favour of Telidon, we have no more than two years to build up an industry capable of competing worldwide.

To support this undertaking, Telidon research will continue to be a priority activity in DOC. For the next two years, we will concentrate on making additional features available in the Telidon system to satisfy identified market demands. Many of these features are expected to be offered shortly by competing videotex systems.

We will work actively with industry to complete the development of low-cost user terminals, captioning for the deaf, automated picture input systems, and full cable channel broadcast and person-to-person communication hardware and software.

We will establish precise development projects and schedules to support the private sector's marketing and R & D activities.

Space program

We must maintain our rate of success in the field of space communications. Organizational changes designed to better coordinate the Government's space activities are now being discussed. I fully endorse your recommendation for an organizational structure that has both public and private sector involvement and will make sure that your views are considered.

Cabinet approval has been obtained for continued participation in the extension of the Definition Phase of the L-Sat Program. However, a review of possible program benefits – focusing on future industrial returns – will be carried out before funding for the remainder of the program is sought. The Canadian space industry has submitted detailed proposals for the solar array sub-system and for a major share of spacecraft system testing, for which the David Florida Laboratory at the CRC would be used. Other bids by Canadian companies for equipment to be incorporated into the power sub-system and payload are under consideration by the L-SAT prime contractor, British Aerospace.

Cabinet has also approved a program of studies for the timely development of mobile satellite services in Canada, and we are currently involved in the concept definition phase. The program concept involves a broad range of mobile services for public and military use in Canada. The MSAT program will include the maximum practicable NASA involvement. Several program options are being considered in detail, including a Canadian-led program with a 1986 launch and a joint Canada/U.S. program involving a larger satellite, with a 1990 launch. Considerations of user needs, industrial benefits, cost, risk, and the consequences of not proceeding with an early launch would appear to weigh in favour of the first option at this time.

Regulatory issues

Our ongoing efforts to improve strategic planning and update the draft communications legislation are generally in line with the thrust of your recommendation for a statement of national purpose.

But, taking into consideration the general nature of the statements which would be found in such documents and the complex and dynamic character of the field of communications, we are also using other means to strive for clarification and improved understanding among all interested parties of what is in Canada's best interest. Within the Federal Government, the policy and expenditure management process is one where departmental priorities, objectives and work plans are discussed with Cabinet. The Strategic Overview of the Department's programs, submitted each spring to Cabinet, sets out in considerable detail the policy framework governing all DOC programs. We also have regular meetings between federal and provincial Ministers and senior officials to deal with matters of mutual concern. Finally, we have instituted very effective sounding boards, such as the CVCC and CRAB, in order to familiarize industry representatives with our goals and to collaborate with them in planning the future.

Recent rounds of debates on the Constitution have not made it possible to obtain a priority for communications legislation, but the Minister of Communications intends to press forward with this project at the earliest possible time.

Telecommunications standards

It is increasingly recognized that technical and administrative standards, as well as providing for the orderly development of the telecommunications industry, may be a prerequisite to significant investment in manufacturing capability. Standards development involves all sectors of the Canadian community – policy makers, regulators, service providers, manufacturers and consumers.

Standards are either mandatory or voluntary depending on the statutory authority for their implementation in Canada. Standards development also occurs at both the international and domestic levels.

In Canada, the Department has become increasingly active in the standards writing organizations of the Standards Council of Canada. Furthermore, the Department has strong participation in the ITU Technical Committees, CCIR and CCITT, as well as ISO. A number of consultative committees provide the type of interaction with industry recommended by CRAB, including The Canadian Radio Technical Planning Board, The Terminal Attachment Program Advisory Committee, The Technical Advisory Committee on Broadcasting, The Canadian Videotex Consultative Committee (Standards Sub-Committee), and The Canadian National Office for International Radio Consultative Committee and International Telegraph and Telephone Consultative Committee.

Within government, DOC has actively contributed to work in the Government Electronic Data Processing Standards Committee and to the Interdepartmental Committee on Standards Policy Related to the GATT Agreement on Non-Tariff Barriers to Trade.

In sum, there is recognition of the increasing importance of standards for national telecommunications policy and industrial strategy. Consequently, standards development has been identified as an item for inclusion in the strategic planning objectives of the Department.

Reviewing the role of research in radio technology and systems

In the 1970s the prime role of research in radio technology and systems was to develop the knowledge required to open up new and unused portions of the radio frequency spectrum. As a result, research on improving the reliability of radio systems operating in the more conventional parts of the spectrum and making more efficient use of the spectrum was somewhat neglected. In the 1980s the challenge will be to make more efficient and better use of the radio frequency spectrum by developing systems capable of adapting to propagation and interference variations, by improving the spectral efficiency of radio equipment, and by developing criteria by which the available spectrum can be shared more effectively by many users. A number of

new and exciting ideas are being considered which will form the basis for a national plan. It is hoped that it will soon be possible to integrate these ideas into a comprehensive strategy which will be responsive to government priorities, and to obtain the necessary resources for its implementation.

This comprehensive effort to develop research strategy in the area of radio technology and systems is undertaken in recognition of the fact that the Communications Research Centre is a national centre for communications excellence whose role is to support the R & D requirements of Canadian industry and other government departments and agencies. Thus, it is in line with today's consensus concerning the ability of government laboratories to serve a wider clientele than the departments in which they are located.

I entirely support the idea that we should set ourselves an objective regarding the part of the research budget which would be reserved for fundamental or exploratory research for new projects. Your suggestion that this should be set at 15% seems a reasonable proposal. We will keep it in mind during our ongoing strategic planning review, which will be conducted in collaboration with the Canadian research community.

Current radar activities at the CRC comprise a balance between background research aimed at meeting anticipated future mission requirements and project research leading to the development of Canadian industry. With respect to the latter, we strive to ensure maximum benefits for our industry from identified government equipment procurement programs. Although these research activities are directed primarily at the needs of National Defence, steps are now being taken to explore the requirements of other departments for radar research in support of their procurement programs. In particular, MOSST, at the request of DOC, is leading a study to review government radar activities. Additionally, DOC is examining the possibility of developing a proposal, jointly with other interested departments, to increase its radar effort, specifically to promote an expanded industrial capability which can respond to Canada's domestic requirements.

Mobile radio systems

I am very sympathetic to the impatience manifested by industry concerning the slow process for the development of a mobile radio licensing policy. But apart from international discussions which have been conducted successfully and which are reflected in the new international radio regulations coming into force on January 1, 1982, national sub-allocation plans had to be elaborated and cannot be finalized before consultations have been completed with Canadian industry. Also, certain bilateral agreements with the United States must be ratified. It is important that we and our southern neighbours agree on the sharing of the new frequencies now available for the mobile radio service in the vicinity of the border. Furthermore, the protection of other radio services from possible interference from

mobile radio operations (and vice-versa) in the newly acquired frequency spectrum needed to be studied. These tasks are nearing completion and the results should be made public very soon.

Now that other major programs such as Telidon are well established, the department will be giving high priority to obtaining the necessary resources for mobile radio, since we agree that it has a very promising industrial spill-over potential. In particular, a Cabinet submission has been prepared for a major program expansion in the area of mobile radio technology and systems research. We will also review the appropriate role of the various sectors in such research, in order to maximize the efficient use of resources. Along these lines, coordination on mobile radio matters both within the department and with other organizations (IT&C, NRC, MOT, etc.) is recognized as important. The program proposal mentioned above has been discussed extensively amongst these groups and day-to-day activities are routinely taking place in a coordinated manner.

The research on both RACE and SYNCOMPEX, although it suffered for a short while from uncertainty in funding, has been reestablished as an important commitment within our radio systems research program. It is our intention to pursue these developments in conjunction with industry and to maximize the exploitation of the basic work in this area at the research centre.

It is recognized that mobile radio is subject to intense world-wide competition and that our competitive position in this area may finally depend on how we are perceived in related international activities. In this regard, over the past five years we have made a concentrated effort to increase Canadian participation in the activities of the CCIR and the CCITT. The department's participation has, however, not been consistent, and we will work at improving this situation in the future. DOC staff also represent DND's interests, as part of our military commitment, at various telecommunication fora such as TTCP and NATO/AGARD.

More generally, the Department recognizes that, if the requirements of the Canadian telecommunications sector are going to continue to be met, priority must be given to effective Canadian participation in the main international forum, the International Telecommunication Union (ITU), and to key bilateral relationships, including that with the U.S.A. Preparations are already well under way for Canadian participation in the ITU's 1982 Plenipotentiary Conference and in the important World Administrative Radio Conferences (WARCs) and Regional Administrative Radio Conferences (RARCs) that will be held over the next few years. The Canadian private sector is contributing to these preparations.

Office communications system

It is vital to our Office Communications Program that a cooperative relationship develop between the Government and the private sector. To assist in the development of this relationship, the Department has organized an industry advisory group, under the

chairmanship of Dr. Carl Beigie, in which 15 Canadian firms will be asked to participate as members. Through this group it is hoped we will find ways of working more closely with industry in the development of state of the art office technology products in Canada.

Need for a focus on component development

A preliminary meeting was held recently between DOC, DND and IT&C concerning your recommendation for an inter-departmental effort in the area of microelectronic and electro-optical devices. While discussions were very preliminary and tentative, they included, among other things, proposals for the composition of a committee, its name and its terms of reference.

The department recognizes not only the importance of GaAs semiconductor technology for implementing high-speed (gigabit) electronic circuitry, but also the potential of this material to provide the monolithic base on which to marry electronic and optical devices, thereby forming the opto-electronic integrated circuits of the future. Development activity in this field embraces several other projects concerning new studies, laboratory processes and experiments, and transfer of technology to industry. Other microelectronic components and materials under development, test and evaluation include surface acoustic wave, vertical diffusion metal oxide semi-conductor, and very high speed integrated devices and materials. Thus a good base exists upon which to support a component development activity such as you propose.

Conclusion

Even though the process of reviewing and exchanging views on communications research is a rather laborious task, it is an essential activity which must be undertaken regularly to ensure full comprehension of the ramifications of developments in this field by all those involved in Government and industry.

This year's exercise has contributed significantly to that objective. It has provided an invaluable source of information which will help the Department to better select its priorities and shape its strategies.

I am looking forward to the next meeting of CRAB, which I feel should be held within a year of your last meeting.

Yours sincerely,



Pierre Juneau

The 1980 Report Committee

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R. D. Voyer, Secretary
J. Coleman
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* New members for 1980/81
** Alternative representative