CABLE TV IN ORBIT

by courtesy of
Canadian Cable Television Association

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An Advanced Management Concept is proposed for the entire cable TV industry, in which related industries with a delivery requirement to home, office, school or public authority find a participative role. The objective of such a concept is to stimulate the growth of the communications industry in all branches while reducing the time and effort now devoted to rationalizing present and future institutional arrangements.

The ample capacity of cable, from head-end to end user, is capable of expansion to national dimensions through new technologies such as satellite transmission. This concept may be arrived at in phases, the first being regional in scope utilizing microwave extension from a strategically placed satellite receive station. Eventual national satellite-cable distribution systems may replace microwave subsystems with earth stations as added channel usage brings into play the economics of extended terrestrial versus space methods.

Inherent in such a concept is the question whether competition in delivery systems will proliferate customer services or have the opposite effect. The broadest economic advantage arises from contact with the eventual consumer, the general public. As telephone delivery system technology has prospered by orderly access to the consumer, so might other electronic services, but order in the development of cable TV toward its true potential is not currently apparent, either in the USA or in Canada.

A possible solution lies in the creation of national cable-TV operational entities outside of the trade associations. Patterns for such a development are found in the Intelsat structure, Aeronautical Radio Inc, and in certain other techno-economic organizations. Evolutionary efficiency is achieved through the use of existing talent and expertise together with the regenerative discipline of avoiding obsolescence rather than being overcome by it.

A management and capital concept for maximizing service to the public, profit to entrepreneurs and incentive to innovation is proposed, emphasizing the private sector. The profit centers would be found in participation in transmission methods and provision of viable services to customers, with emphasis on the latter, where the effects of open competition would have a beneficial effect on economic, social and political communities.

The introduction of new technology into an established pattern of economic and political relationships is seldom an orderly process. Arthur C. Clarke, speaking of the synchronous satellite, observes "thus science, with its usual cheerful irresponsibility, has laid another squalling infant on the doorstep of civilisation". It took from 1945, when the theory of extraterrestrial relay was set forth in Clarke's modest essay, to 1962 before a suitable method of introducing this technology into practical use was devised, and more confusion attended the creation of institutional arrangements than the construction of a working satellite system itself.

The engineering debate over the merits of stationary or orbiting model communications satellites was resolved by a practical demonstration in 1965 which proved the technical feasibility of Clarke's concept. The right to use it for communications services, however, and to operate it as a business, created a legal, political and industrial battle for years, involving regiments of lawyers, legislators and lobbyists. And if an acceptable pattern of usage seems to have emerged in the international arena, the same drama begins again wherever the use of satellites is contemplated for domestic communications, including broadcasting and the newest arrival in communications, cable television.

Clarke's 'squalling infant', therefore, in a domestic context might better have been announced as twins. In at least one nation, the United States, domestic communications satellites and cable television were officially blessed by the regulatory authorities at about the same time by the announcement of policy concerning both industries.

The Telesat Canada Act of 1968-69 makes no mention of cable television or of broadband networking at all, probably because nobody quite knows who would preside over the introduction and nurture of such a concept. But nowhere in that Act is the idea foreclosed, nor is the cable industry excluded by any provision of the Act from a place on the Telesat Board, along with the 'approved' common carriers, should it wish to participate as an industry. The difficulty arises in prescribing just what the boundaries of the cable television industry might be, particularly in such company.

In other countries the timing of policy directives has not been quite as clearly indicative of the basic proposition that cable and satellite have arrived together "on the doorstep of civilisation" and must henceforth be reared as members of the same family. Nor, perhaps, did the United States Federal Communications Commission mean to establish this relationship quite so precisely in its 1972 outburst of policy-making. But the relationship exists in the thinking of engineers and entrepreneurs, as well as in certain official though discreetly objective circles in many countries, -- England, Japan, Mexico, Canada, France, -- to name a few, and the principles to be followed in developing it are already the subject of debate, encouragement, and, quite naturally, strong opposition.

It is the fundamental theme of this paper that the communications industry as a whole is greater than the sum of its individual parts. This is true largely because of what happens to the community when its communications systems function efficiently, and what happens when they do not. Like the spin-offs of a space program, communications by-products find their way into every aspect of community life, and if the community as such does not exist to start with, an appropriate communications structure will sooner or later bring it into being. This will be observed in the gradual emergence of a world community around the global satellite system, now in its adolescence.

Eighty-six nations now communicate directly amongst themselves through the Intelsat organization and its space system. While there may be that many different national reactions to the scoring of a goal in a soccer match, eight hundred million viewers of this single event surely constitute a community in some sense. As domestic satellites move into service in such amorphous and dispersed communities as India and Indonesia, a sense of cohesion must inevitably result among formerly heterogeneous populations. And as naturally curious people come to realize that the synchronous satellite is an incorrigible border-jumper, domestic and international satellite systems will sooner or later find a way to interact officially instead of simply experimentally. The population of Sacramento, California in 1973, for example, became incensed when an experimental satellite transmission of a Canadian rugby game had to be terminated; the experiment was in fact too successful and embarrassed everybody but the engineering staff. Geographical borders had become anachronisms.

Cable television, the natural partner of the satellite in bringing high-capacity service to the individual user, seems capable both of creating new communities and of energizing those that already exist. The logical development of the cable industry would lead one to expect new types of programming, informational uses enhanced by the computer and greatly increased delivery capability for social services, to mention but a few of the possibilities. The total effects of this process are not yet clear, but without doubt will be pervasive, touching the community and the individual in many and varied ways. Cable television is a multi-medium. Its constituencies include the financial, the educational and the political, in addition to the technical. It ranges far beyond video programming in its potential effects and perturbations. It is hardly surprising that its status in the communications family answers rather well the same definition which Clarke applied to his satellite.

Hence it is well to try, at least, to apply the 'unified field' approach to the unruly state of known facts and unknown potentials of the communications industry of the present day. Emphasis on cable and satellite in this paper does not mean that organizational principles herein are restricted to those two disciplines and could not therefore be superseded by a new technique, whatever it might be. Technology moves too rapidly to permit such a view. It is the purpose, rather, to give technology free rein and let the public be not damned, but served, by a sensible combination of experience and innovation. Fear of obsolescence and preoccupation with the status quo are not material objections. However real they may be, good marketing is a more powerful influence, when coupled with a logical technical development, and that is where the communications industry now stands. The future belongs to those who will take the initiative with the materials available today.

Cable-Satellite Policy

Most of the discussion about cable television up to now has centered on the local scene into which cable has intruded with such disturbing effects. With few exceptions, cable is an intra-urban medium. Exploitation of its abundant capacity is limited to mostly minor attempts at local program origination and hesitant experiments in home terminal technology for which the public may be ready but the hardware is not. The cable 'industry', if it can be called that, is growing to national dimensions in the size of its subscribership but still consists of a collection of locally autonomous entities whose power as an industry is dissipated and ineffective compared to the older established practitioners of communications.

It is not in the least surprising that those concerned with cable have concentrated mainly on extending their clientele in order to improve their financial health. This is the obvious growth area of the new industry. But as the total subscribership begins to attain the figures representing a major market, whether for advertiser, subscription TV or other 'ancillary' services of which cable is capable, it would appear that the cable industry was ready for the centralized business structure which would be needed to manage large scale marketing of a full range of broadband services. And as the market begins to assume such dimensions, by coincidence the technology needed to concentrate it also has appeared, has been tested and has been proven effective. This is the technology of the communications satellite.

It has been noted that this technology is so far ahead of the market for useful application that every satellite launched now or in the near future will be obsolescent, in terms of its basic design and capacity, before it leaves the pad. The same thought might apply to the cable television industry whose capacity, even with coaxial cable techniques, can well exceed current marketable uses. Should future cable systems turn to fibre optics for local distribution, the imbalance would be even more severe.

However, the basic pattern for this decade is fairly clear. The long-haul transmission of broadband communications at economical cost is rendered feasible by the satellite and therefore a broadband national service makes economic as well as technical sense. There are those ready to provide this long-haul service but the potential user, cable television, is not yet a national entity. It may indeed suddenly become one, but an equally possible pattern of growth toward that status would be by the step-by-step formation of regional groupings using terrestrial interconnection and regional interest programming. This can be observed currently in the United States, notably in the midwest, where a single-channel microwave link brings a cable-only program service to over a million subscribers. The extension of this service to other areas and with multiple channels is a function of the relative costs of distance-based terrestrial charges versus the cost of an earth station plus a proportionate share of the cost of the distance - insensitive satellite circuit. The probable result, however, would be a mix of terrestrial and space distribution methods, with the latter supplying the main momentum toward a truly national interconnection.

Fortunately, in both Canada and the United States the satellite was recognized as an innovation too broad in its implications to fit into the existing communications industry pattern as simply an add-on to what was already there. The long and involved legislative history which led to the United States Communications Act of 1962 reveals attempts by many different segments of industry, as well as government, to gain an exclusive jurisdiction over satellite technology. The final result was an ingenious compromise amongst government, carriers and public, the latter meaning principally Wall Street, which was worked out between the late President Kennedy and certain powerful elements in the United States Congress. Of particular interest was the fact that broadcasting and cable television interests as such were more or less neglected in that Act, the assumption being that as a carrier's carrier the international satellite system would function as a wholesaler, selling service only through the carriers. This is an important reference point for subsequent history. Domestic regulatory policy in the United States thereupon did an about-face and opened satellite ownership and access to anyone.

During 1972, the same year that United States domestic satellite policy was promulgated, the FCC addressed itself to the release of the cable television industry from the freeze under which it had lain for several years. The Report and Order of February 12, 1972, while hardly a license to complete and open expansion, at least recognized cable as a legitimate partner in communications enterprise. There was no resolution of the question of whether or not it would grow up as a common carrier. There was, however, recognition of cable's responsibility to develop and market new communications services. The Order also made passing reference to the eventual interconnection of cable systems by satellite. This may have been the most significant sentence in the entire document. For much of the rest concerned rules under which distant broadcast signals might be carried, and the satellite, if put into the service of cable-originated material, simply renders these rules obsolete.

The passing mention of satellites in the FCC Cable Order of 1972 suggests them as a technique for networking, but no rules or principles are set forth as guidance toward this goal. The FCC simply erected a signpost, pointing the way to whomever wished to pioneer. The timing of the Order, however, was a clear enough implication that if only somebody would bring about a convergence of cable and satellite, the regulators would be greatly relieved and the public might even benefit. The technological implications might help resolve some otherwise insoluble politico-economic problems such as the distant-signal rules. But the private sector clearly would have to rise to this challenge in some manner other than with jurisdictional dispute and positional warfare. This has not yet occurred.

The Telesat-Canada Act of 1968-69 was also a compromise among established interests. Broadcasters are not included in the corporate structure, nor is cable television. Broadcasting would seem to be clearly identified, by omission, at least, as a customer for satellite carrier distribution. Cable television, with both a local and long-haul carrier potential as distributor of broadband services, might be less capable of definition. Dependent to an extent on broadcasters for its main fare, it must look elsewhere for the development of its true broadband potential. Would its natural ally in the process be Telesat, as a compatible technological extension of its services, or the terrestrial common carriers, as themselves interested in developing those same services? Since Telesat is partly owned by the carriers, it might itself bridge the gap, but until this question is resolved, the rapid expansion of the communications industry's potential service to the public would seem to be impeded.

It is central to the theme of this paper that this policy question could be resolved more readily in the private sector than on the official level, both in Canada and the United States. Public administration tends to follow the principle that the more complex a problem, the more official agencies must be created to manage it. A corollary is that more attention is then given to jurisdictional than to substantive aspects, affording ample opportunity for the perpetuation of whatever advantages were built into the status quo. It is this cycle which, given the present promise of technological advance, must be broken.

Meanwhile, public policy regulating cable and satellite development treats each as a separate industry, as it does, indeed, the broadcasting and terrestrial carrier industries. This overlooks the scientific fact as noted in recent proceedings, that "Communications technology is now imposing unity upon all communications techniques. There is no longer any distinction among the various forms of communications. "All of them can pass through the same relays in the form of identical electronic pulses". The distinction would appear to lie mainly in the marketing area, and in access not to facilities, but in access to the customer.

Space Segment

A satellite communications system consists of space segment, including control stations, and earth segment, meaning earth stations for transmitting and reception of communications traffic.

Domestic satellites are now on station providing service both to the United States and Canada. While the Canadian entity, Telesat-Canada, clearly has a common carrier franchise, United States policy in theory at least, allows anyone possessed of sufficient financial and other responsibility to engage in satellite transmission. In practice, as far as the space segment is concerned, the United States carriers have preempted the field for the immediate future. In view of the fact that there will be an abundance of satellite channel availability, this prospect seems not to worry users, who assume that the rate structure will reflect the supply conditions. Aggressive marketing of this supply will be a new and welcome turn of events to users such as the cable industry. Broadcasters, who must plan cautiously before changing from one method of distribution to another, nevertheless have moved to take advantage of satellite economy when it appears feasible to do so.

The use of satellite transmission to extend the local reach of cable systems to network dimensions is a natural technical development. The satellite, with its insensitivity to distance, makes broadband networking economically practicable for all conceivable services. The problem arises when the service comes back to earth after its relay through space. It is the ultimate delivery first to earth receiver and then to end user, that causes both problem and opportunity. The time to structure a solution is now, before policy or practice has hardened into a pattern.

Earth Segment

The terrestrial facilities of a satellite system consist of stations performing both transmission and reception, and receive-only stations.

Transmit/receive stations in the United States are at present only provided by the common carriers who have initiated domestic satellite service. Although point-to-point service generally is not considered the peak efficiency use of the satellite mode, the satellite carriers are still able to provide considerable cost reductions for this type of service compared to terrestrial carrier rates.

Broadcast and cable industries contemplate the use of satellite distribution for point-to-many-points service. In the future these users might turn from carrier-provided transmission service to their own, but economic and other considerations indicate that the origination of traffic of this kind will pass through carrier-owned-and-operated transmission facilities for the foreseeable future. United States carriers plan such facilities in the basic pattern represented by the major markets of New York, Los Angeles, Dallas, Chicago, Seattle, Atlanta and Washington. Beyond these transmit/receive locations, the broadcast and cable industries have the opportunity in the immediate future to establish their own receive/only stations wherever it makes sense to do so. The cross-over point where they undertake the same task in the major markets is arrived at, if ever, merely as a question of economics and relations with those who now provide the services needed.

While it appears to an observer that Telesat-Canada has a satellite-carrier monopoly by law, it by no means appears certain that Telesat would not readily supply satellite transmission directly to earth stations at CATV system head-ends. In fact, David Golden, President of Telesat, proposed exactly that, in an address to the CCTA in June 1974. He was referring to the transmission of broadcast entertainment, however, and did not touch on the matter of the capacity of cable to deliver other services the long-haul of which might be rendered more convenient by satellite. But his silence on this point is deafening. Telesat's facilities could be heavily used by non-broadcast customers as soon as it becomes clear how the ultimate delivery to the customer is to be accomplished.

Telesat seems to have both ends of the monopoly of satellite traffic at present, but it is not clear what might happen if other broadband services developed first on a local basis and then, through the proliferation of receive/only earth stations, on a network basis. In Canada, as in the United States, future activity of this type seems to turn largely on this point; who will own and operate the earth stations, both in their simple receive/only configuration and in the inevitable increasing complexity required as the broadband network moves toward the ultimate pattern of the wired nation?

The first United States applications for earth stations (and satellites) for domestic use were filed by the ABC network. In rapid succession applications came from independent network affiliates and from cable TV concerns. The broadcast networks aimed at thus lowering line charges, and their applications for satellite systems seem to have had a certain competitive effect even before any domestic satellite left the ground. A network-affiliates' application for earth stations looked toward achieving some degree of local program autonomy, but also aimed at the future when the local earth station would be the interface with the entire world of broadband services including television entertainment. The cable system applications for earth stations contemplated a new industry entirely, in which cable as the high-capacity delivery means to the customer opened up new horizons of industrial, entertainment, educational and public service activity. Cable people in all countries share these visions. And just as with Intelsat their realization at a profit is closely tied in with ownership and operation of the earth station.

A survey of these applications and interests reveals the conflicts that inhibit the marketing of new communications services today. The United States cable operator looks forward to the day when he can offer, in addition to good reception, a variety of alternative programming and some new computer-assisted and two-way delights. But, as does his Canadian counterpart, he quickly runs afoul of some real or imaginary existing franchise. His troubles over pole-attachments are rarely simply economic bargaining. His potential for subdividing the mass audience frightens the networks. His pay-TV possibilities throw the conventional broadcaster into a panic.

If to these perturbances is added the satellite link to which cable TV gains access through an earth station at the system head-end, the possibilities for doing mischief to one or another Establishment would seem to multiply. For example, if United States cable penetration climbed above 50% on a national basis, the satellite-to-earth-station-to-cable link could well become the primary distribution link for the broadcaster himself. At that point he probably would depart the crowded air waves and rely mainly on cable to reach his audience. What once was the Establishment would have become an Appendage. This is not to denigrate the former, but only to support the principle of offering alternatives to the public, some of which, as in the motor car industry, might well originate from the Establishment itself.

It will be seen that it is not the network as a program source which would risk loss of position in this event. It would be the individual broadcast station, which clearly reveals why certain United States broadcast stations applied for a local satellite receiver on their own and actually against the wishes of their network headquarters.

In the absence of a conceptual approach to the configuration of the ground environment, there is a fair prospect for some strife over earth station proprietorship. Policy in the United States says that anybody can enter the game. Policy in Canada may not yet be clearly defined in this area, which is why the private sector should perhaps take certain initiatives. Meanwhile, the satellite, like a moon, pulls the economic tides this way and that, inundating some, and possibly leaving others on the beach.

A Modest Proposal

The principal business interests which are touched by the foregoing are the terrestrial and space carriers, cable TV and the broadcasters. Regulators have, but are not, interests. It is assumed that manufacturers can produce appropriate hardware for everyone within today's state of the art. The objectives of all can be grouped under the principle of providing greater service to the public, and since all parties are dealing with the same commodity, identical electronic impulses, the differentiation of interest only arises in the origination,creation and delivery of the end product, the form in which those impulses are received by the customer.

As in the case of the telephone monopolies, the most sensitive area of dispute and future economic advantage is that of contact with the customer who pays the bill without knowing by what route a communications service has reached him. If the route itself becomes a battleground, the service may never reach him at all.

Influences, therefore, should be created which stimulate the variety and form of communications services offered to the customer, which maximize the usage of facilities in being and which provide at least one area of cooperative activity among currently hostile interests.

Of those facilities in being, the space segment, the cable systems, the terrestrial lines and the broadcast stations are proprietary interests which nobody has the slightest intention of relinquishing to any degree whatsoever.

The least-defined area, and smallest in capital requirement, is that of the earth station, which is the key link in a broadband, satellite-interconnected delivery system for maximum communications service to the public.

It is also the factor which could trigger the amalgamation of autonomous cable systems into a continent-wide interconnection, an event which today is awaiting the resolution of the chicken-and-egg syndrome or the appearance of risk capital which will underwrite the first orders. The regulators, however, do not stand in the way.

In view of the fact that carriers, cable TV, broadcasters and satellite companies have all made what are in effect adverse claims to ownership and operation of various parts of satellite systems, they must all envision substantial benefit from being seized with such rights. So it was with the international satellite. The result there was a pooling of interests at least in the space segment.

The prospect domestically could well be a pooling of interests in the earth segment. If so, how could this be constructed, and what benefits might flow?

Initially, it must be noted that if such a proposal is acceptable in principle, its particular application to Canada, the United States or other environment must be left to further study, in light of current conditions.

In organizational terms what is proposed is either a corporate or cooperative entity the business of which is the leasing of satellite channels from carriers and the provision of earth stations to CATV systems for delivery of traffic through cable systems to end users. The entity would be so constructed, by statute if necessary, to permit inclusion of the primary interests involved, for which there is precedent in other industries.

Domestically the space facility is already in place. The cable earth station is not, and is not likely to be until the prospect of business is more clearly seen. It is proposed that those who would originate such business organize to establish the earth station network, on the basis of their own self-interest, if nothing else.

Intelsat provides some patterns on the cooperative side. There the percentage cost of building the space facilities is borne by each nation on the basis of the traffic expected to be generated by that nation. Revenues are divided by the same rule, resulting in a wash operation. Profits of participants derive from the use of the earth stations providing access to the satellite.

Domestically the cost of building and emplacing earth stations could be borne by cable systems, if there were in existence some body dedicated to developing services to be put over them. A cooperative aimed at filling this gap could be formed by those who would supply such services and market them, the earth station being a mere adjunct to this end. But, excluding known services such as broadcasting, cablecasting, pay-casting and some local community services, the license to develop fully the broadband potential is not firmly in any hands. Whatever participant in a cooperative developed a profitable communications service which used the earth station would at least be sure of this means of access to the market. Were the station in other hands this might not be the case. Recovery of initial costs would be followed by revenue sharing among users of the earth station, according to volume of usage.

A corporate form of joint venture would place both satellite leasing and earth station ownership and access on a profit basis. Should the participants be the major interests above, what they really agree to share is the development of the widest possible communications services to the public, available through leased satellite channels and earth stations, both being the profit centers of such an entity.

It is easy to see what might happen if this present vacuum were to be filled by an entity not representative of the interests most directly concerned. The CATV operators would have lost any control over their own growth as a communications medium of national scope. The carrier would have lost any hold they might have had on broadband access to the customer. The broadcaster would be left to wither away on his own single channel as did Life and Look in the print media.

If on the other hand there is profit both in retailing satellite capacity and in the leasing, ownership and operation of earth stations, that profit is directly tied to volume, and the members of such a venture would naturally look to every means possible of increasing use of the facilities. It would be less than wisdom on the part of carrier participants to delay initiation of services the right to delivery of which, for example, was currently a matter of controversy. It would be equally unwise for cable operators to seek to preserve their present customer access on the basis of today's technology over which others might have a technological advantage. The joint venture which brought an earth station network into existence might provide the basis for cooperation in this and other areas.

The broadcaster who feels threatened by the many-channel capability of cable is also staking too much on his present mode of operations. Participation in an earth station venture, whether as network or independent, gives him a lead on tomorrow's inevitable multiple-network broadcasting-cablecasting developments. As today's network begins to subdivide itself, a process which the satellite will accelerate, earth stations emerge as the pivotal point for the change and the most convenient entry point for the broadcast industry's ownership stake in the future. It was earlier noted that the private sector could probably energize the communications expansion herein discussed more readily than if regulators were awaited as the prime movers. In the United States there is a visible disposition in Washington toward the encouragement of a broadband network by any means.

Perhaps it is realized that rather than any restraint of trade this prospect carries with it quite the opposite. In Canada it would seem that the process of forming a cable network is under way unimpeded by anti-trust law but retarded by a complex mixture of regulatory and industrial restraints. It is this impasse which the concept of a new communications enterprise built around the earth station is aimed at dissolving. While regulation struggles with a maze of adverse relationships, private enterprise could assist in providing solutions by joint-venturing in the only unstaked territory left.

Conclusion

In today's communications, spheres of influence have been assigned, or appropriated by major segments of the industry. These relate to the telephone monopolies, the cable franchises, the broadcasting frequencies, the satellite and other common carriers. Competition among these entities is sometimes real, sometimes artificial and protectively structured. Given the influence of regulatory bodies, none of these entities is likely to disappear or to relinquish the ground upon which it stands.

A new technological partnership, that of the satellite and cable TV, offers potential and real grounds for competition with existing interests. These interests if given a role within the framework of the new technology could enhance their own prospects while at the same time stimulating the growth of total communications service to the public.

The one area of the total industry which has not been pre-empted is that of the earth station required to provide cable system interconnection through satellite. This part of the complex provides the interface between a long-haul and a local delivery to the customer. Its viability increases in direct proportion to volume of traffic. Its usefulness to all forms and volume of traffic should not be artificially limited, as all traffic is, ultimately, the same thing in transmission.

To initiate the manufacture, installation and use of earth stations at cable head-ends, it is proposed that the various interests concerned with selling a service to a customer form a joint venture, either as a cooperative or in corporate form. Coupled with the earth station activity the joint venture would lease satellite channels either for retail at a profit or as a 'wash' operation as in Intelsat, fostering the widest use of these channels to minimize the cost.

Such a joint venture would have every incentive to make the greatest possible use of the earth station. It would form a basis of cooperation to develop new services to the public. It would serve as the origination point of the next generation of technological development presumably because of greater efficiency and profit potential.

Finally, unless such a joint venture breaks the current impasse, the various reverberations associated with a new industrial initiative will be slow in coming. Communications as an industry would suffer from this delay, and the community, region and nation would be deprived of the great benefits to orderly social development which can be provided by a mature and stable communications environment.