COMMUNICATION
RESEARCH TRENDS

The Changing World
of International Telecommunications

In October 1987, over 750 exhibitors displayed the latest in telecommunications technology at the TELECOM 87 Exhibition in Geneva. A year later, also in Geneva, representatives of up to 162 nations will gather at the International Telecommunication Union (ITU) to complete the World Administrative Radio Conference (WARC) on the use of the geostationary satellite orbit (ORB-85) that began in August 1985.

The two events underline the extent to which international telecommunications is at the same time big business (global sales of telecommunications equipment and services were over US$325 billion in 1986) and high politics. It is at events such as these that the struggle for world economic and political power is made visible. The buyers at TELECOM deciding which technologies are suitable to meet their investment plans, and the negotiators at Space WARC deciding how to manage access to the geostationary orbit, represent the key players in the battle to shape the future of international telecommunications.

Who are these key players in international telecommunications? What roles in determining policy are played by governments, by telecommunications authorities, by business users, by the military, and by domestic consumers? Which countries and which social groups are likely to benefit from current trends in telecommunications? Will the needs of the Third World be met? What are the possibilities of building a more equitable international telecommunications system?

This issue of TRENDS highlights the main changes in the world of international telecommunications, reviews some major studies of how policy is made and makes some suggestions for research.

REVIEW ARTICLE

I: Telecommunications in Transition: The Deregulation Debate

Robert R. Bruce, Jeffrey P. Cunard and Mark D. Director. *From Telecommunications to Electronic Services: A Global Spectrum of Definitions, Boundary Lines and Structures*. London: Butterworth & Co, 1986. 597 pp. ISBN 0-88063-103-1.

Kenneth Dyson and Peter Humphreys (eds.) *The Politics of The Communications Revolution in Western Europe*. London: Frank Cass & Co., 1986. 233 pp. ISBN 0-7146-3284-8.

Jill Hills. *Deregulating Telecoms: Competition and Control in the United States, Japan and Britain*. London: Frances Pinter, 1986. 220 pp. ISBN 0-86187-568-0.

Marcellus S. Snow (ed.) *Marketplace for Telecommunications: Regulation and Deregulation in Industrialized Democracies*. New York: London: Longman. 1986. 304 pp. ISBN 0-582-28600-X.

The world of international telecommunications has been disrupted over the past ten years by three major forces. The first of these is rapid technological change, bringing new products and services, as well as new firms into once closed and stable telecommunications markets. The second is fierce competition in telecommunications markets as Western industrialized countries seek to cope with disruptions in world trade and economic recession by promoting economic growth in the services and information sector. The third is the national and international effort to develop a new regulatory structure that will cope with technological change, promote economic growth, and reconcile the interests of business and domestic consumers.

Researchers have examined this changing environment from economic, political and legal perspectives, all of which are represented in the books considered here. Snow et al. adopt a predominately economic approach, Bruce, Cunard and Director consider the regulatory and legal aspects, and Dyson et al. and Hills focus on the political issues and arguments.

The Impact of Technological Change

All four studies agree in identifying the most important technological change in the world of telecommunications as the

coming together of the formerly discrete worlds of computing and telecommunications into a single system. As the ubiquitous microchip has become a key component of telecommunications systems, new transmission, switching and data processing capabilities, equipment and services have been developed. Once the heart of the telephone network was the electro-mechanical switchboard; today computer software controls electronic switches that are essential to the new telephone, satellite and cable systems. Telephone calls, telex messages and television signals used to be transmitted over separate networks and in different forms. Today voice, image and data messages are being converted into digital signals and sent at ever higher speeds down the same fibre optic telephone cable or via the same satellite link from one computer terminal to another.

Economic Consequences of Technological Change

The economic implications of these technological advances are considered most fully in the volume edited by Snow. Two major economic consequences seem clear. In the first place, business and consumer demand for new services and equipment has grown rapidly. Telephone users want their telephones to do much more than simply allow them to speak with another person. They want telephones that can 'remember' frequently dialled numbers and automatically forward calls; telephones that can be used while driving and cordless (radio) telephones.

Above all, users, especially business users, want easy and affordable access to those services, e.g. electronic mail, electronic banking, computer conferencing, and computer data base services, which link telecommunications and data processing. This demand has brought many new companies into the marketplace to offer products which traditional telephone companies have been slow to provide. Companies like Reuters and Dow Jones, for example, which have developed from news agencies into electronic retailers of constantly updated financial information to stock and money markets across the world.

Secondly, telecommunications development costs, especially of the computer software needed to control the new digital switches, are so high that domestic markets are no longer large enough to give an adequate return on investment. In addition, because new products can take up to ten years before coming to market, national postal, telegraph and telecommunications administrations (PTTs) are increasingly buying equipment from foreign suppliers. Telecommunications manufacturers that could once rely on protected domestic markets, like Plessey and GEC in Britain, are being forced to expand internationally in order to survive.

Monopoly vs. Competition in Telecommunications

These technological pressures coincide with an economic and political climate that is increasingly favourable to arguments advocating the restructuring of the telecommunications industry. Governments of all political hues are convinced that competitive and efficient domestic information technology and telecommunications industries are vital for economic growth. US and Japanese companies, in particular, are engaged in a global struggle to dominate the future shape of the computer, information technology and telecommunications business. Less powerful countries, in response, have sought to stimulate investment in their domestic telecommunications and information technology industries.

In this economic and political climate of competition, the PTTs have found their status as public monopolies under question. As Snow points out, over the last hundred years monopoly supply of the telephone service has been almost unquestioned. It has been supported by military arguments which stressed the importance of national control of the communications system, by economic

arguments that telecommunications was a natural monopoly because of the investment required to create and develop a telephone network, and by social arguments that telephone service should be universally available at an affordable cost. These well-rehearsed views are now challenged. The argument is that competition is needed to encourage more efficient and cost-effective use of existing facilities, to stimulate technical innovation and to reduce prices for business customers. Competition, it is felt, will open up new national and international markets in telecommunications systems and will benefit services and associated industries in the banking, insurance, data processing and information services sector.

The Economic Case for Deregulation

Economic arguments for competition achieved their first successes in the USA, where AT&T was deregulated and divested of its local telephone companies. Most contributers to the Snow book consider that, on the whole, US deregulation has brought more benefits to more users. In particular, deregulation enabled new firms to enter the long-distance and international telecommunications market. The resulting competition to reduce tariffs has been of considerable benefit to multinational corporations and large financial, banking and insurance companies, all heavy telecommunications users.

These business benefits have proved attractive to other countries also. Indeed most contributers to Snow et al. agree that greater competition and deregulation in telecommunications are almost inevitable for any country wishing to survive in the international marketplace. Countries failing to introduce some form of competition will, it is argued, suffer as large commercial users divert business towards countries, such as Britain, Canada and Japan, that have followed the US lead.

For these reasons Eli Noam believes that the efforts of European PTTs to restrict the entry of new firms into the telecommunications market is a short-sighted approach.[1] As he points out, deregulation and the transfer of British Telecom (BT) to the private sector in the UK has led to the reduction of BT's international tariffs and the introduction of a competing business telecommunications carrier (Mercury). This has given the UK a competitive advantage over other European countries in which public telecommunications authorities have less freedom to pursue aggressive commercial strategies. Other European countries will be forced to introduce more competitive practices in order to keep their share of business traffic. On the positive side, European countries should realise that US deregulation has given them an opportunity to expand into the US telecommunications market.

From the viewpoint of neo-classical welfare economic theory adopted by many of the contributors to Snow's book, the main danger in the new deregulatory and competitive policies is that they will be implemented half-heartedly. Failure to create a sufficiently strong competitive regulatory frame could allow large companies, such as AT&T, IBM and BT to retain monopoly practices by engaging in cartel-like deals to squeeze their competitors and keep their dominant market shares. For this reason the structure of the regulatory framework within which firms operate becomes crucial.[2]

The Importance of Regulatory Policy

The problem facing would-be regulators is that of devising workable regulatory systems able to balance the often conflicting interests of governments, PTTs, telecommunications manufacturers and users. The PTTs want to retain control over the basic telephone network; private companies want to lease telephone lines and be able to resell excess capacity; manufacturers want more freedom to connect their products to the PTT network; multinational companies want access to protected markets; and all users want lower tariffs and better service. At the same time regulators have to adjust to and cater for the implications of rapid technological change, trying to avoid

applying new rules that have already been side-stepped by technology. Such issues and problems are treated by Bruce et al. in their comparative examination of telecommunications regulation and policymaking in the USA, the UK, Canada, Japan, Finland, West Germany and France.

Initiated in 1984 by the International Institute for Communications, the study was sponsored by some key business and governmental telecommunications players. They included AT&T, Citicorp, Cable & Wireless, Nokia Corporation (the largest industrial corporation in Finland), Nippon Telegraph and Telephone (NTT), the Canadian Department of Communications, Deutsche Bundespost (DBP), the French Direction Générale des Télécommunications (DGT) and the European Commission. The Bruce study details the different regulatory strategies employed by countries as they attempt to accomodate new technologies and services. The stress is on the evolution of new regulatory solutions in response to changing technological and economic pressures. In this perspective the significance of recent legislation such as the British Cable Act, for example, lies precisely in the extent to which it marks a shift away from established conventions. The new Cable Authority which it created has only a limited regulatory brief, in pointed contrast to the wide-ranging regulatory mandate of the established Independent Broadcasting Authority.

New Technologies and New Regulations
The US Federal Communications Commission (FCC) was one of the first bodies to have to rethink the basis of its regulatory policy to accomodate new technology. Traditionally the FCC determined which companies could provide which users with services by classifying them according to their mode of transmission. Different rules applied to broadcasting, to common carriage and to cable systems. A regulated common carrier like AT&T was forbidden to enter the unregulated data processing market, while computer companies, notably IBM, were excluded from telecommunications. Then the time came when IBM wanted to exploit its expertise in software and hardware development by entering the lucrative and expanding telecommunications market, while AT&T wished to develop integrated computer and communication services. The FCC had to decide whether to allow AT&T and IBM into each others territory and how, if at all, it should regulate the new industry being created.

The FCC's solution was to invent a new distinction: that between 'basic' and 'enhanced' services. Basic services, i.e. the ordinary telephone service, were subject to regulation, and enhanced services, i.e. those involving data processing and telecommunications, were not. This distinction meant that AT&T had to be divested of its regulated local telephone companies before it could compete in the area of enhanced services.

Regulatory Systems and National Policies
Other countries, faced with similar regulatory difficulties, have devised similar classifications. In the UK the distinction is between companies providing 'basic' and 'value-added' services, in Japan between 'Type 1' and 'Type 2' services. In France a technological classification ensures that the DGT maintains central control of the public data networks, while allowing the provision of a range of information and electronic mail services. In Germany, by contrast, an economic-based approach is applied that is, in theory at least, relatively liberal towards the leasing of lines for use by private companies, but restrictive towards the range of services which can be offered over the public network.

Everywhere, as Bruce et al. point out, such regulatory categories reflect different pragmatic political and legal choices regarding the degree of competition considered desirable. These new definitional frameworks are a good example of how, in the words of Kenneth

Dyson, national communications policies reflect the complex interaction of the political ideology of governments and the character of relevant domestic policy interests.[3] He stresses the diversity of regulatory policy and suggests that policy decisions for each country can only be understood if we discover who are the actors in the domestic policy arena, their beliefs and values, and the kinds of policy networks and power relations that exist.

The Political Process of Deregulation
How policies are made through the complex interaction of foreign pressures with domestic interests is seen clearly in Hills' analysis of deregulation and privatization in Japan. The Japanese Ministry for Posts and Telecommunications (MPT) defended the telecommunications monopoly of Nippon Telegraph & Telephone (NTT) by preventing large companies from operating their own telecommunications networks. As a result, its frustrated opponents joined together to build a powerful domestic constituency in favour of deregulation. This lobby was strengthened by support from the powerful and prestigious Ministry for International Trade and Industry (MITI). which wanted to extend its bureaucratic responsibilities into telecommunications. At the same time the US government was applying diplomatic pressure for Japan to open its markets to foreign companies. Other interests, including the trade unions and the telecommunications equipment manufacturers, were also actively lobbying for their point of view. Eventually a Japanese compromise was worked out between the major groups in which each was able to gain from the liberalization of the telecommunications market. KDD, for example, the company which lost its monopoly of international message traffic, was compensated by being allowed to compete in the domestic market for the first time.

Winners and Losers
Jill Hills frames her analysis of telecommunications policy by posing a sharply critical question: who benefits and who should benefit from deregulation? Though local Japanese subscribers and callers have been protected from rate rises, Japanese deregulation and privatization has benefitted the large trading houses and multinationals who have entered the computer services and transmission business. It has also benefitted NTT and the bureaucratic power of MPT. The ultimate beneficiary, according to Hills, however, may be IBM-Japan. IBM and NTT are now partners in providing telecommunications and data processing services which use NTT's data network and IBM's computers. Not surprisingly this NTT/IBM link-up was vociferously opposed by Japanese equipment manufacturers, such as Fujitsu and Hitachi, and Hills considers that they may be the ultimate losers.

This conclusion supports her general thesis that countries have little room for manœuvre in the face of the global drive to adopt some form of deregulation. In her view Japan, like Britain, has adopted deregulatory policies which ultimately benefit US interests. Deregulation, in her terms, is a US-directed strategy to free information and telecommunications services from national controls, based on political ideology and the commercial aim of capturing the leadership in the world trade in services.

Hills believes that deregulation means a decreasing concern for the needs of local consumers and for equitable public access to a universal telephone system. She draws pointed attention to the experience of deregulation in the USA and Britain, where she identifies residential users and telecommunications workers as major losers from deregulation. Residential subscribers have lost because they now have to pay higher tariffs for local calls in order that business might benefit from lower long-distance and international rates. Telecommunications workers have lost because of redundancies (the AT&T workforce, for example, has been reduced from 117,000 to 93,000) and the diminution in the power and influence of their trade unions.

Ideology and Reality: The Dilemma of Governments

A less pessimistic stand is taken by Dyson. He contends that governments adapt their policies in the light of experience and that this learning capacity gives some hope that they may, in time, devise policies that protect the general interest while adapting to technical change. This process Dyson calls relearning the 'arts of statecraft'.

The political processes traced by Hills correspond to what Dyson calls the 'brokerage' stage of policy formation. This stage usually follows a period when governments adopt an 'heroic' and bold stance towards the 'wired society', when governments tend to be wildly optimistic about the benefits of information technology. A good example is the British government's enthusiasm in 1982 for the cabling of Britain.

The subsequent 'brokerage' stage marks an advance on the first stage in that it signifies that governments are beginning to subject 'information society' ideology to more critical scrutiny. At this second stage governments quietly abandon their previous sanguine expectations, and get down to the practical politics of 'trade-offs' among political parties, domestic businesses, multinational corporations, trade unions, government ministries and consumer groups. This two-stage development can also be seen at the international level, as is made clear in Claire Shearman's analysis of European collaborative ventures in telecommunications and computing, such as the EUREKA or RACE projects.[4]

As Peter Humphreys shows, this movement from heroic aspiration to rather more mundane reality is not effected without some degree of political strain as, in Dyson's terms, governments try to establish a governing competence while maintaining ideological credibility.[5] In Britain, for example, American deregulation was regarded favourably by a Conservative government with an ideological commitment to free market economics, combined with a belief in new technology as an engine of economic growth. These predispositions made the government responsive to demands that British Telecom's (BT) telecommunications monopoly should be broken. The ideology of competition, however, came in conflict with an equally ideological desire to bring about a wider ownership of shares by the general public. In addition, the government had a pragmatic desire to keep BT strong enough to compete successfully in world markets. Eventually the desire to make BT an attractive investment and the share flotation a success ensured that competition with BT was strictly limited.

The British government's dilemma is not unique, and it neatly illustrates how infrequently governments engage in the 'arts of statecraft'. For Dyson, the development of 'statecraft' requires the encouragement of a more open and rational policymaking process and an intellectual effort to develop a language of 'symbolic politics' that appeals to more than narrow economic self-interest. In this regard it is heartening to note the serious public debate about the social and economic implications of the communications revolution and telecommunications deregulation that has taken place in West Germany. In the view of Peter Humphreys, that debate is a healthy sign that one country at least is 'undergoing a careful learning process about the nature and implications of the "third industrial revolution".' Such debate might be a foundation upon which governments could eventually construct new telecommunications regulatory systems able to reconcile economic advantage and the wider public interest.

II: Conflict and Cooperation in International Telecommunications

Donna A. Demac (ed.) *Tracing New Orbits: Cooperation and Competition in Global Satellite Development*. New York: Columbia University Press, 1986. 329 pp. ISBN 0-231-06344-X.

Andrea Kavanaugh. 'Star WARCs and New Systems: An Analysis of US International Satellite Policy Formation', *Telecommunications Policy*, 10 (2) 1986, pp. 93-105.

Donna A. Demac, George A. Codding, Heather E. Hudson and Ram S. Jakhu. *Equity in Orbit: The 1985 ITU Space WARC: A Background Paper*; and *Access To Orbit: After the 1985 ITU Space WARC: A Follow-up Report*. London: International Institute of Communications, 1985 and 1986. 28 pp. and 21 pp.

Larry Martinez. *Communication Satellites: Power Politics in Space*. Dedham, MA: Artech House, 1985. 186 pp. ISBN 0-89006-167-X.
Anthony M. Rutkowski. *Integrated Services Digital Networks*. Dedham, MA: Artech House, 1985. 324 pp. ISBN 0-89006-146-7.

The 'arts of statecraft', which Dyson deems so necessary for governments developing domestic telecommunications policies, are equally needed at the international level. States in the international arena have to construct policies that balance successfully their need to cooperate with others and a deep-rooted desire to guard their sovereign freedom of action. In the model proposed by Larry Martinez international telecommunications policy takes place within an anarchic global system in which states attempt to maximize their power and security while minimizing their dependency on, or vulnerability to, factors outside their control.

In practical terms this means that in order that each nation may benefit from an efficient, reliable and affordable global telecommunications network institutions have had to be created in which mutually beneficial arrangements could be worked out. In 1865 the International Telegraph Union was formed by twenty European nations in order to resolve technical and financial problems arising from the expansion of international telegraphy. One of its first tasks was to set international standards for transmissions in Morse code. The regulation of radio began in 1906 when twenty-nine countries formed a new International Radiotelegraph Union (IRU) and drew up a convention to minimize interference with each other's transmissions by specifying that particular radio services should be given certain bands of radio frequencies. In 1932 the IRU and the International Telegraph Union merged to form a new International Telecommunication Union (ITU), which now has some 162 members.

Over the past 150 years or so bilateral treaties and multilateral agreements in the ITU have enabled states to build a cooperative framework for international telecommunications. That framework has enabled the interconnection of different domestic telecommunications networks; the use of agreed technical standards; the sharing out of radio frequencies; the allocation of orbital slots for satellites; the building and operation of transoceanic cables; and the setting of tariffs for international voice, image, text and data message traffic.

Today international telecommunications policy has become too important for governments to leave to PTTs to work out among themselves, and questions that were once seen as technical problems best left to telecommunications experts are now being addressed by trade negotiators and diplomats. In the process it is becoming ever more difficult for PTTs to develop long-term strategies for international telecommunications cooperation; the result is a new volatility and instability in the international telecommunications arena.

This section reports on research that has begun to explore the background to and the implications of this new instability. The problem is investigated in relation to three major areas of actual and potential international conflict: the future of the International Telecommunications Satellite Organization (INTELSAT); the dispute over access to the orbit/spectrum resource in the ITU, and the process of setting technical standards for the new global Integrated Services Digital Network (ISDN).

1. The US vs. INTELSAT

In all three of these areas changing technology is opening up new policy options and helping to change perceptions of national interest. This process is seen with striking clarity in the current battle between INTELSAT and the US government over the issue of private international satellite systems.

The irony is that, in 1964, INTELSAT was set up on the initiative of the USA, which at that time perceived its national interests to be best served by the formation of an international cooperative to provide a global satellite communications system. Today INTELSAT has a membership of 110 nations and operates seventeen satellites in geostationary orbit over the Atlantic, Indian and Pacific Oceans providing communications through more than 850 earth stations to 170 countries. In technical, economic and foreign relations terms INTELSAT has been a success for US policy. It has proved to be a very economical means of providing satellite services to both developed and developing countries. Its pricing policies have meant that the busiest routes, such as those over the Atlantic and between the USA and Japan, have effectively subsidised the 'thin' routes between developing countries. Of the 1600 routes operated by INTELSAT, 10% provide 50% of its income, while 50% of its routes provide only 10% of income.

The Challenge of Private Satellites
Since its inception, the members of INTELSAT, including the USA, have been concerned to ensure that its global network should not be disrupted in any way that would produce significant economic harm. It was this principle that seemed to be threatened by the US decision in September 1985 to authorize five private companies (PanAmSat, Orion, Cygnus, RCA and ISI), to provide satellite communications in competition with INTELSAT. The new systems would offer satellite and ground equipment to private users on a purchase or long-term lease basis for voice, data and television transmission. The companies, with the exception of PanAmSat, proposed to offer services across the North Atlantic, but by January 1987 RCA had withdrawn and the only company which had moved towards operation, PanAmSat (which had purchased Cygnus), was planning to provide a service to Latin America.

Economic Arguments for and against Private Systems
The INTELSAT reaction to the US move was anxiety that competing systems would divert a significant amount of business because its policy of averaging rates for all regions regardless of traffic would not allow it to offer competitive tariffs in the North Atlantic. It also defended the status quo by pointing out that it faced increased competition from new trans-Atlantic fibre optic cables due to enter service in 1988. This latter problem was compounded by the US government decision to permit AT&T and other carriers to divert traffic from satellite to cable, a policy which may cost INTELSAT as much as $40-50 million between 1986 and 1990.

Advocates of the private systems, on the other hand, argued that the new satellites would divert relatively little message traffic away from INTELSAT but would develop new services and stimulate new traffic.

In *Tracing New Orbits*, articles by Snow, Vizas and Goldschmidt each subject these economic arguments to scrutiny. Marcellus Snow sets out the conceptual and historical background to the current debate and tries to establish a theoretical frame that would allow economists to determine the extent to which INTELSAT is a natural monopoly.[6] If INTELSAT is a natural monopoly, then competition would ultimately not be in the interests of the user community as a whole. Vizas[7] and Goldschmidt[8], however, argue in favour of the benefits of private satellite systems. Douglas Goldschmidt, in his defence of competition, stresses that INTELSAT's existing technology requires heavy investment in large earth stations by developing countries and argues that PanAmSat's proposed service will give a more cost-effective domestic and regional service. PanAmSat already has an agreement with Peru for a high-powered satellite link, so it seems that one Third World country at least sees some benefit in cooperating with an INTELSAT competitor.

Snow concludes his analysis with a wry remark about the conspicuous lack of the empirical cost data needed to corroborate or refute the economic arguments for and against competition. The development of policy in this area, in his view, will be undertaken largely without the benefit of empirical research and under the compulsions of political ideology.

How US Policy Was Formed
Evidence for this rather bleak view is provided by Andrea Kavanaugh, who analyses US policy processes from a political science perspective. Her study carefully charts the clash of personalities and policy positions within the Reagan administration prior to the announcement of the competitive policy. Kavanaugh analyses the composition of the government group charged with formulating policy, and notes that of the fourteen agencies represented (including NASA; the Departments of State, Defense, Commerce, and Justice; USAID; the CIA and the US Information Agency) most were potential users and beneficiaries of private satellite systems. Though the State Department made an effort to protect INTELSAT for foreign policy reasons, US economic and trade interests, as expressed through the Department of Commerce, were given much more weight. In Kavanaugh's view, the determining factor in shaping policy was a shared belief among all groups in the value of a competitive open market-place in forwarding US government, defence, and business interests.

The INTELSAT Dispute and International Relations
Third World countries are in general very worried by the US moves and have been supportive of INTELSAT's arguments against change. Andrea Kavanaugh points out, however, that it is the possibility of competition which has prompted INTELSAT to

introduce new measures (e.g. offering to sell or lease spare capacity to developing countries for domestic purposes) to answer the needs of the Third World. Within the Third World, too, as PanAmSat's agreement with Peru shows, there are differing perceptions of what international arrangements might be most beneficial.

In another contribution to *Tracing New Orbits*, Joseph Pelton of INTELSAT examines the issue in terms of international relations.[9] His argument is that the US is moving unilaterally to institute changes without international negotiations and in disregard of established procedures for reconciling national and international interests. This unilateral export of domestic policies into the international arena gives him particular concern as it threatens to upset a carefully built up consensus designed to meet the needs of the widest range of countries.

Larry Martinez helps to put the whole dispute into perspective when he reminds us that the INTELSAT monopoly has already been derogated by advances in satellite technology which made it feasible for countries to develop national and regional satellite systems like ARABSAT. In so doing, states were able to maximize the benefits of satellite communications for themselves while reducing their dependency on INTELSAT. The US promotion of private systems is, in this perspective, no more than could be expected, once technological innovation had reduced the need for the US to satisfy its own goals by entering into cooperative arrangements with others.

2. Equity in Orbit

The conflict between the USA and INTELSAT highlights the extent to which international telecommunications policy has become a focus of contending economic and political interests. This contention is most obviously and dramatically revealed when nations come together in the ITU to discuss and decide upon the procedures and principles which will regulate how the resources of the radio spectrum and the geostationary orbit are to be apportioned.

The ending of the Second World War saw three related conferences at Atlantic City in 1947 which resulted in a revision of the procedures for registering and securing recognition of spectrum uses. Radio frequencies were allocated on a first-come, first-served basis with the onus on latecomers to avoid interference with existing services. After the emergence of satellite communications this principle was extended to the allocation of orbital positions and frequencies for geostationary satellites.

The Struggle for Equitable Access
These arrangements remained largely unchallenged until the 1960s when new, less industrialized nations began to join the ITU. They were acutely conscious of their dependence upon satellite and telecommunications technology imported from industrialized nations and of the expense and difficulty of developing their own telecommunications infrastructures. Whereas the established space powers emphasised the need to make efficient use of the orbit/spectrum resource, developing nations emphasised the need to ensure 'equitable access' for all countries, even though only a few of them (notably Brazil, India and Indonesia) were capable of putting satellites into orbit.

The first major sign of a changing balance of power in the ITU came at the 1977 World Administrative Radio Conference called to discuss direct broadcast satellites (WARC-BS). The developing countries secured, for the first time, an agreement that, in some instances, the orbit/spectrum resource should be subject to planning. The ITU members agreed to allocate each country in Europe, Africa and Asia a specific orbital position and a number of frequency bands for direct broadcast satellites.

The developing countries followed up their 1977 victory at the 1979 general WARC. Third World delegates succeeded in getting a resolution passed that called for a conference to devise ways to 'guarantee in practice for all countries equitable access to the geostationary satellite orbit and the frequency bands allocated to space services'. The same resolution stated that the geostationary orbit and the radio spectrum were 'limited natural resources'.

ORB-85: The Space WARC
The conference called for in 1979 finally took shape as the 1985 Space WARC. The first part of the conference took place in Geneva in August and September 1985, and the second part will take place in 1988. At Geneva delegates struggled to arrive at a mutually acceptable definition of the term 'equitable access', and to adopt a planning method which would ensure such access.

Negotiations at the Space WARC were, according to the observations of Demac, Codding, Hudson and Jakhu, difficult and complicated. Delegates discussed whether, what and how to plan. Several industrialized countries, notably Britain and the USA, argued that the orbit was not overcrowded, that no country had ever been denied access and that technological innovations (especially close spacing and more efficient frequency use and reuse) would ensure that the future needs of all administrations could be accommodated.

On the other side, a bloc of developing countries, led by Kenya and Algeria, proposed numerous a priori plans. These countries perceived the geostationary orbit to be a scarce natural resource overwhelmingly under the control of a few space powers. According to Hudson, of the 149 commercial satellites in orbit in mid-1984, 121 had been launched since 1979, yet only fourteen satellites serving developing countries were launched during this period.[10] Even taking into account the INTELSAT satellites, satellites for the exclusive use of industrialized countries make up around 72% of the total. Developing countries also felt that the costs of access to the geostationary orbit were becoming unacceptably high. They resented arguments that technology will solve their problems because they had no wish to use more expensive and complicated hardware in order to operate at higher radio frequencies. In fact, at the Second UN Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82) they proposed that developed countries should move into the Ku (14/12gHz) and Ka (20/30gHz) bands, vacating the popular and most economical C-band frequencies (6/4gHz) for developing country satellite use.

The Space WARC Compromise
The plan that finally emerged from the Space WARC guarantees all countries at least one orbital position and an associated block of frequencies for domestic systems providing domestic services. These frequencies are in the so-called 'expansion bands', hitherto unused frequencies in the C and Ku bands. The details of this plan will be worked out in 1988. The second part of the plan envisages periodic multilateral planning meetings to coordinate use of the unplanned part of the spectrum.

Though the compromise represents, in the view of Demac, Codding et al., a step forward in resolving some of the conflicting demands of industrialized and developing countries, it is not without problems. The allotment plan will require the use of expensive computer facilities and time to prepare. Countries such as the USA, UK and France, however, are not prepared to ease present budgetary

constraints in order to provide the ITU secretariat with the extra funding to carry out the work it has been required to undertake. From the developing country viewpoint the multilateral planning process will stretch their meagre resources of expertise to the limit. It will be difficult for them to ensure that their few qualified representatives are properly briefed and available to attend all the meetings which will discuss and resolve the critical technical questions.

Access, Use and National Sovereignty
The Space WARC compromise tends to support the political analysis made by Martinez. In his view the expressed concern of developing countries over guaranteed and equitable access is not the fundamental motivation for their political actions within the ITU. He argues that developing countries are focusing on questions of access as a way of trying to gain some bargaining leverage in discussions about the use to which the orbit/spectrum resource is put. Developed countries are largely correct in saying that access to the geostationary orbit is not a pressing problem, but they should realise that the way they are using the orbit/spectrum resource is.

In terms of the New World Information and Communication Order debate the current use regime in space favours the few countries with national systems over those, such as the majority of developing countries, which depend upon foreign satellite technology and operators and multi-administration systems such as INTELSAT. National sovereignty is at the core of the orbit/ spectrum battle. Direct broadcast satellites, which beam programmes across national frontiers, and remote-sensing satellites, which can monitor natural resources of a country without its consent, emphasise for developing countries their lack of power to assert their sovereignty.

Space Militarization and the Third World Response
Developing countries also perceive with alarm the increasing use by the super-powers of satellites for military functions, for spying and communications, as well as for the development of space-based weapons. Though they have no power to restrain this extension of super-power rivalry into space, developing countries are able to win political concessions by threatening to disrupt arrangements favourable to the space powers in fora such as the ITU in which they have voting majorities. Thus more than ten developing countries at the 1985 Space WARC used the threat of planning in the X frequency band (8/7gHz) (which is that used by military satellites) as a bargaining counter in the negotiations over planning in the C and Ka bands.

Industrialized countries are vulnerable to Third World pressure because they are increasingly dependent economically and militarily on fast, effective and secure global communications networks. Industrialized countries need to consolidate the operational capability of the ITU, for as their stake in advanced global telecommunications networks increases, the costs of breaking up the collective arrangements also increases. If, for example, the WARC compromise breaks down, developing countries might press for wholesale changes in the existing radio regulations and so impair the ability of the ITU to carry out basic frequency coordination and standard setting functions.

3. The Politics of Standards

Both the power and the vulnerability of the industrialized countries vis-à-vis developing countries are nowhere more apparent than in those ITU bodies that are concerned to set international technical standards. That standard-setting work takes place in a number of Study Groups organized around two major International Consultative Committees: the International Radio Consultative Committee (CCIR) and the International Telegraph and Telephone Consultative Committee (CCITT).

The Development of ISDNs
At present the CCITT is by far the most influential and important committee. Its recommendations are laying down the lines upon which a new global telecommunications system is coming into being. This new system is based upon Integrated Services Digital Networks (ISDNs), networks that bring together computer and telecommunications systems through a common network to provide 'universal and complete services for capturing, storing, processing and' transporting' information. In 1988 the World Administrative Telegraph and Telephone Conference (WATTC-88) will mark another important step towards a global ISDN because of the potential to embody ISDN concepts in a treaty which would govern certain telecommunications arrangements among the ITU members.

In 1984, according to Anthony Rutkowski's comprehensive account, most of the CCITT Study Groups were oriented around the ISDN concept and one of the most prominent advocates of ISDN, Theodor Irmer of Germany, was elected CCITT director. Membership of CCITT Study Groups is open not only to PTTs but also to private telecommunications firms, of which AT&T has been the most active. The representatives of business users also have a say in CCITT deliberations via their representatives in the International Telecommunications Users Group.

ISDN Standards and Financial Power
PTTs, telecommunications firms and business users devote an immense amount of time and effort to working in CCITT Study Groups because their recommendations have such substantial financial implications. Establishment of a consensus within one of the CCITT Study Groups is usually sufficient to achieve the de facto global adoption of a new or altered technical standard. These standards then determine where the financial and technical burden of modifying local systems to allow interconnection will fall. In addition, adoption of a certain standard will benefit those firms holding the relevant patents over rival technologies.

The development of ISDN standards has been accompanied by intense rivalry between PTTs and business users about whether ISDNs should be under public or private control. Dan Schiller argues that part of the drive to privatize and deregulate telecommunications comes from business user fears about the effects of a PTT-controlled ISDN.[11] Technical standards determine which group of firms provides which functions. A major battle has been fought between large network suppliers and providers of customer services equipment. There is a choice to be made 'between placing ISDN intelligence within the network itself, or in a range of specialized terminal equipment'. Business users have supported the equipment suppliers as they have an interest in ensuring that they can retain control over equipment installed on their premises. Both these positions are actively supported by the US government.

The users also do not want the higher technical standards being promoted by the PTTs if these mean higher costs. Dan Schiller highlights business concern that ISDN standards should not restrict competition or outlaw private leased lines. In particular, business users fear that, if public ISDNs are allowed to switch to volume-pricing, i.e. by the amount of message traffic carried, measured in 'bits' of data, they will face sharply increased costs. The leasing of

a dedicated line is far cheaper. Users think, therefore, that they need to weaken the monopoly position of PTTs before ISDN is introduced, a position also supported by the US government.

The Third World and the CCITT Process

Satisfying the demands of the larger business users may not work to the advantage of the least influential members of the CCITT, the developing countries. Schiller points out that the development of private telecommunications networks further reduces the control that developing countries might be able to exercise over multinational corporations. Furthermore, it is difficult for developing countries to take steps to protect their interests because of the ways in which the CCITT study groups work.

A major problem is finding the financial resources and technical experts to participate in the discussions at all. In his discussion of the changing attitudes of industrialized countries to provision of technical assistance to developing countries, Jean-Luc Renaud draws attention to the poor attendance by developing countries in CCITT deliberations.[12] In 1979, for example, forty-four countries took part in seventeen CCITT Study Groups, but only fifteen were developing countries and only one had attended a majority of the groups.

This lack of participation in CCITT meetings is a serious handicap to developing countries because, as Anthony Rutkowski notes, the most important technical working documents are only distributed to meeting participants. If delegates are unable to attend the meeting, they may not get to hear of important contributions and suggestions until it is too late to influence the outcome of the discussion. This procedure effectively circumvents the power of developing countries in the one CCITT institution, the Plenary Assembly, that meets every four years, in which they have a voting majority.

The Politics of Technical Assistance

Not surprisingly the developing countries have become increasingly unhappy with what they consider to be institutions devoted to promoting the interests of industrialized countries and multinational corporations. At the same time the industrialized countries have become worried that Third World dissatisfaction might hinder the technical work of the CCITT and the CCIR by action taken in the Plenary Assemblies, as developing countries have threatened to use their voting majorities to cut back on the budget allocated to CCI work.

Renaud's analysis of ITU moves to provide technical help to developing countries indicates how such help has grown as CCITT work has become more crucial. As early as 1970 the CCIR established a Technical Cooperation Committee in order to try and help experts from developing countries gain the necessary information and experience to participate in the work of the study groups. More recently the industrialized countries have agreed to support the Centre for Telecommunications Development in the tacit hope that they will be able to secure a CCITT research agenda favourable to their interests. Thus the movement towards world ISDN standards both increases the relative dependence of the Third World on the industrialized countries and their technologies while paradoxically giving them increased opportunities to put pressure on the richer states to provide more aid and development assistance.

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4. Claire Shearman, 'European Collaboration in Computing and Telecommunications: A Policy Approach', in *The Politics of the Communications Revolution in Western Europe*, pp. 147-162.
5. Peter Humphreys, 'Legitimating the Communications Revolution: Governments, Parties and Trade Unions in Britain, France and West Germany', in *The Politics of the Communications Revolution in Western Europe*, pp. 163-194.
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PERSPECTIVES ON COMMUNICATION RESEARCH

Policy, Power and Information: Making Research Accessible

Who benefits most from telecommunications policy research and who has most need of telecommunications policy research?

These questions are prompted by the research studies and projects reviewed in these pages. A moment's reflection makes it obvious that the research is of most benefit to those organizations and institutions that are already well endowed with financial and intellectual resources. It is obvious, too, that those least able to influence the course of telecommunications policy, from domestic consumers to poorer nations, are those least likely to gain access to and make use of research findings. The extent of the problem can be illustrated by considering the difference between two research endeavours recently initiated by the International Institute of Communications (IIC).

Informing the Informed

The first of these IIC projects is the Study of Telecommunications Structures, which has already resulted in the publication of Bruce, Cunard and Director's massive examination of regulatory policies. Over the past few months the project has produced an offshoot, the International Telecommunications Forum. The Forum, like the study, is sponsored by powerful organizations, including in this case AT&T, IBM-Europe, Reuters, NTT, the Australian Department of Communications, the Dutch PTT, Teleglobe Canada, and the European Space Agency. The Forum aims to provide these sponsors with regular briefings on current policy issues in international telecommunications.

Both the study by Bruce et al. and the Forum are clearly of most

value to those policy makers, public and private, who are already well supplied with information. The major sponsors of the research are institutions equipped to assimilate, evaluate and use the findings of such research to support their policy goals.

The least able to benefit from such research are those groups which cannot easily buy into the International Telecommunications Forum or translate the findings of Bruce et al. into effective strategies. In particular, many of the poorer developing countries that could benefit immensely from improvements in telecommunications find it difficult to get their voices heard in telecommunications policy forums, such as the important ITU International Consultative Committees (CCIs). They experience the results of policy decisions but have almost no say in forming those decisions.

The Space WARC Reports

A way to help such nations to acquire information that could help them improve their bargaining power is suggested by the second IIC project: the reports on the Space WARC. Four researchers, Demac, Codding, Hudson and Jakhu, wrote two briefing papers on the 1985 Space WARC negotiations. Written with the interests of developing nations in mind, these short reports (the longest is only twenty-eight pages) were distributed free to all delegations attending the conference. They were intended to be of particular value to smaller and less technically expert delegations. The IIC intends to follow up these reports with other bulletins on the second session of the Space WARC in 1988.

The 1985 reports were a result of collaboration between the International Institute of Communications (which published the reports in English, French and Spanish); the Catholic Communication Campaign of the US Catholic Conference; the Board of Global Ministries and Communications Division of the United Methodist Church, USA; Intermedia, the overseas communication division of the National Council of the Churches of Christ, USA; The Center for Space Law and Policy, University of Colorado, Boulder, CO, USA; and the World Association for Christian Communication, London.

Modest though this second project is, its importance lies in the fact that it is a practical action on the part of the information-rich to share knowledge with the information-poor. In the foreword to the first report, *Equity in Orbit*, the authors express the hope that through their paper 'decision making and the potential for mutual agreement will be enhanced through better participation due to better information'.

Making Research Accessible

This hope needs to be encouraged and built upon. At least three steps could be taken to make telecommunications research more relevant and accessible to the Third World nations. First, Third World universities and other centres could encourage research on telecommunication policy issues and begin to build up research expertise in this area. Secondly, Third World countries might establish their own international telecommunications policy fora, perhaps on a regional basis for regular discussion of telecommunications policy questions.

Finally, First World research centres and institutes like the IIC could make a major effort to inform churches, development aid agencies, and other non-governmental agencies concerned about development issues of the importance of international telecommunications policy. Issues of telecommunications policy need to be put on the development agenda if sustained financial support is to be available for more initiatives on the lines of the IIC WARC project. The WARC project relied heavily upon church sources for its support. To that extent it indicates how far governments and private firms still are from providing independent advice and information to policymakers from developing nations.

Jim McDonnell
Issue Editor

Current Research on Telecommunications

ALGERIA
Ali Khattab (Centre for Mass Communication Research, Univ of Leicester, 104 Regent Rd, Leicester LE1 7LT) is doing doctoral research on international satellite telecommunications policy with special reference to Algeria.

AUSTRALIA
R. Horton and J. Donovan (Telecom Australia, 199 William Street, Melbourne, Victoria 3000) have published a methodology for establishing 'International Comparisons of Telecommunications Charges' in *Telecommunications Policy*, 11 (3) 1987, pp. 269-280.
Prof Donald Lamberton and N.D. Karunaratne (Information Research Unit, Dept of Economics, Univ of Queensland, St Lucia, Brisbane 4067) and Meheroo Jussawalla (Institute of Culture and Communication, East-West Center, 1777 East-West Rd, Honolulu, HI 96848, USA) have finished a study of primary information sectors of ten Asian and Pacific economies to be published by Ablex.

CANADA
Government of Canada, Department of Communications (300 Slater St, Ottawa, ONT K1A OC8) undertakes and funds research on all aspects of telecommunications policy.
Prof Nicholas M. Matte and Dr Ram S. Jakhu (Institute and Centre of Air and Space Law, McGill University, 3690 Peel Street, Montreal, Quebec H3A 1W9) have completed *The Law of International Telecommunications in Canada* (Baden-Baden:Nomos Verlag, forthcoming).
Dr Robin E. Mansell (Information, Computers and Communications Policy Division, OECD, 2 rue Andre Pascal, 75775 Paris Cedex 16) has recently written 'Information Sector Policy Analysis: Conceptual Frameworks and a Canadian Illustration', *Gazette*, 39, 1987, pp. 195-210.
Prof. Vincent Mosco (Dept of Sociology, Queens University, Kingston, ONT K7L 3N6) researches the changing role of the state in the regulation and control of telecommunications technology.

COLOMBIA
Sylvia Ospina (1225 New Hampshire Ave., NW, Apt. 728, Washington, DC 20036, USA) is preparing an LL.M. thesis on the feasibility of a regional satellite system for Andean Pact countries.

FRANCE
Henri Delahaie (27 ter Blvd Diderot, 75012 Paris) recently published 'La Dérégulation du Système International des Satellites INTELSAT', *Revue Tiers Monde*, 28 (111) 1987, pp. 671-676.
IDATE (Institut de l'Audiovisuel et des Telecommunications en Europe, Bureaux de Polygone, 34000 Montpellier) publishes *Bulletin de l'IDATE* and *Letter of Liason for European Research in Communication*. Nezih Dincbudak, Yves Gassot and Laurent Gille have recently conducted studies on various aspects of telecommunications policy and deregulation. IDATE is also coordinating a preliminary study on telecommunications and ISDN in Britain, France, Italy, Spain, Denmark, West Germany, Belgium and the Netherlands. (Contact Alain Veyret).
M.C. Monnoyer (Université de Bordeaux, 86 rue de l'Ecole Normale, 33200 Bordeaux-Caudéran) and J. Philippe (Université de Droit Economie et Sciences, Cours Gambetta, 13627 Aix en Provence Cedex) analyse new markets for business information services.
Gerard Pogorel (Univ de Compiegne, Dept TSH-MDI, BP-233, 60266 Compiegne Cedex) organized a recent Paris conference (19-20 June 1987), 'Asymetric Deregulation: The Dynamics of Telecommunications Policies in Europe and the US', with Columbia University's Center for Telecommunications and Business Studies.
Jean Voge (Direction General des Telecommunications, Direction des Affaires, Industrielles et Internationales, 7 Bvd Romain Rolland, 92128 Montrouge) wrote 'A Survey of French Regulatory Policy' in *Snow* (ed.) *Marketplace for Telecommunications*. pp. 106-130; and with Jean-Pierre Chamoux (Mission a la Reglementation, Ministere des Postes et Telecommunications, 20 Ave de Segur, 75700 Paris) 'France: a Regulatory Balance', *Intermedia*, 15 (4/5) 1987, pp.47-48.

GREAT BRITAIN

Centre for Communication and Information Studies (Prof. Nicholas Garnham, Director, Polytechnic of Central London, 235 High Holborn, London WC1V 7DN) has three major projects: a comparative study of regulatory regimes in the UK, Japan, Canada, France and Germany; a collaborative study with French, Belgian, Dutch, Danish, German and Italian researchers on ISDN; and a study of the UK market for 'enhanced' telecommunications services (VANS). **Richard Collins** studies UK telecommunications regulation and plans a study of local distribution loops.

City University, Dept of Social Science and Humanities, (Northampton Square, London EC1V 0HB) **Dr Jill Hills** continues research into telecommunications and information technology policies; **Prof Jeremy Tunstall** investigates communications policies in the context of deregulation.

Prof James Foreman-Peck and **Dorothy Manning** (Dept of Economics, Univ of Newcastle-upon-Tyne, NE1 7RU) are studying the economic implications of different market structures in the telecommunications sector in collaboration with **Jürgen Müller** (D.I.W., German Institute for Economic Research, Konigin-Luise Strasse 5, 1000 Berlin 33).

Ian Gow (Japanese Business Policy Unit, Univ of Warwick, Coventry CV4 7AL) compares UK and Japanese government-industry relations in telecommunications.

International Institute of Communications (John Howkins, Executive Director; **Gregory Staple,** Director of Projects Tavistock House South, Tavistock Square, London WC1H 9LF) is engaged in stage two of the Study of Telecommunications Structures Project. This stage will look at developing countries and will examine key issues in the international regulation of telecommunications. The STS project has also developed into a quarterly International Telecommunications Forum in which the project's sponsors are briefed on topics of special interest, e.g. preparations for the WATTC.

Prof Francis Lyall (Dept of Public Law, Univ of Aberdeen, Taylor Building, Aberdeen AB9 2UB) is completing a book on *Law and Space Telecommunications.*

Dr Douglas C. Pitt (Dept of Administration, Strathclyde Business School, Univ of Strathclyde, 130 Rottenrow, Glasgow, G4 0GE) studies government-industry relations in the UK and US telecommunications sectors.

University of Lancaster (Dept of Politics, Fylde College, Bailrigg, Lancaster LA1 4YT) **Martin Edmonds** (also at School of Public Affairs, National Security Program, Univ of Maryland) is investigating the divestiture of AT&T and its implications for US national security; **Dr Mahindra Naraine** researches international telecommunications and satellite regulatory policies.

Dr John F. Volger (Dept of Social Studies, Liverpool Polytechnic, Walton House, 52 Tithebarn St, Liverpool L2 2NG) studies the international political economy of new communication technologies and the role of the ITU.

INDIA

Prof K. D. Gaur (Utkal University, PO Vani Vihar, Bhubaneswar 751004, Dist Puri, Orissa) has written *The Law of International Telecommunications in India* (Baden-Baden: Nomos Verlag, forthcoming).

JAPAN

Dr Youichi Ito (Institute for Communications Research, Keio University, 2-15-45 Mita, Minato-Ku, Tokyo 108) wrote a chapter on 'Telecommunications and Industrial Policies in Japan: Recent Developments' for **Snow** (ed.) *Marketplace for Telecommunications.* pp. 201-230.

Research Institute of Telecommunications and Economics (1-6-19 Azabudai, Minato-Ku, Tokyo) has published many studies on Japanese information and telecommunications policies.

NETHERLANDS

Dr Cees Hamelink (Institute of Social Studies (PO Box 90733, 2509 LS The Hague) leads study on national communication policies and international law in Asia and collaborates in European ISDN research.

Dr A. W. Hins and **Dr P. B. Hugenholtz** (Universiteit van Amsterdam, Spui 21, 1012 WX Amsterdam) have completed *The Law of International Telecommunications in the Netherlands* (Baden-Baden: Nomos Verlag, forthcoming).

SPAIN

FUNDESCO (Fundacion para el Desarrollo de la Funcion Social de las Comunicaciones, Calle Alcala 61, 28014 Madrid) analyzes future communication technologies, especially in Spain, and stimulates debate about their social implications. It also publishes books and the review, *Telos.*

SWITZERLAND

Universität Bern (Hochschulstr. 4, 3012 Bern) **Prof Carl Christian von Weizäcker** and **Dr Günter Knieps** investigate the economics of telecommunications regulation. **Prof von Weizäcker** has contributed 'Free Entry into Telecommunications' to **Snow** (ed.) *Marketplace for Telecommunications.* pp. 20-41.

UNITED STATES

Prof Stephen R. Barnett (Univ of California, Berkeley, CA) with **Prof Michael Botein** and **Prof Eli Noam** has written *The Law of International Telecommunications in the United States* (Baden-Baden: Nomos Verlag, forthcoming).

Anne W. Branscomb (Program on Information Resources Policy, Harvard University, Aiken 200, 33 Oxford ST, Cambridge, MA 02138) is studying information property rights, especially legal efforts to decrease information piracy.

Center for Telecommunications and Information Studies (Columbia University, New York, NY 10027). **Eli M. Noam** and **Michael Botein** direct a number of research projects including one on European telecommunications and one on Pacific Basin telecommunications policies with the **Center on Japanese Economy and Business at the Columbia Graduate School of Business.**

Prof George C. Codding (Dept of Political Science, Univ of Colorado, Campus Box 333, Boulder, CO 80309) is the leading authority on the ITU and its policies.

Donna Demac (Interactive Telecommunications Program, New York University, 721 Broadway, 4th Floor, New York, NY 10003) studies international satellite networks, US restrictions on technological information exports and the consequences of the lack of copyright and patent laws in culturally and technologically dependent states.

Prof Heather Hudson (Director, Telecommunications Applications and Policy, McLaren College of Business, Univ of San Francisco, Ignatian Heights, San Francisco, CA 94117-1080) continues to study telecommunications and rural development and analysed preparations by developing countries for the 1988 Space WARC.

Meheroo Jussawalla (Institute of Culture and Communication, East-West Center, 1777 East-West Rd, Honolulu, HI 96848) studies changes in the political economy of Pacific Islands as an outcome of policy choice of available satellite options.

Andrea Kavanaugh (Environmental Design and Planning, Virginia Polytechnic Institute, Blacksburg, VA 24061) researches diffusion of innovation in satellite technology, especially for rural telephone infrastructure in developing countries.

Megumi Komiya (1231 Osceola Ave., St Paul, MN 55105) studies ISDN evolution and telecommunications policies in Japan and the USA.

Dr Larry Martinez (Office of International Affairs, National Telecommunications and Information Administration, Washington, DC 20230) investigates the regulation of new and innovative telecommunications services, including the effects of 'digitization'.

Prof Hamid Mowlana (School of International Service, The American University, 4400 Massachusetts Ave., NW, Washington, DC 20016) and **Laurie J. Wilson** have completed *Communication and Development: A Global Assessment* (Paris: Unesco, forthcoming) which has three chapters on telecommunications policies, especially in the field of space technology.

Prof Roger G. Noll (Dept of Economics, Stanford Univ, Stanford, CA 94305-6072) is engaged in a major long-term study of the consequences of AT&T divestiture and deregulation in the USA. He also directs a three-year study of domestic telecommunications policy.

G. Russell Pipe (Transnational Data and Communications Report, PO Box 2039, Springfield, VA 22152) directs a project to examine the implications of trade rules on international telecommunications services and possible impacts on intergovernmental organizations such as the ITU.

Dr Jean-Luc Renaud (School of Journalism, Univ of Minnesota, 111 Murphy Hall, 206 Church St S.E., Minneapolis, MN 55455-0418) has completed a book MSS on *The Changing Dynamics of the International Telecommunication Union: An Historical Analysis of Development Assistance Policy.*

Dr Dan Schiller (Graduate School of Library and Information Science, University of California, 405 Hilgard Ave, Los Angeles, CA 90024) studies the growth of private telecommunications networks at the expense of comprehensive public networks and the international telecommunications industry in the inter-war period.

Prof. Marcellus S. Snow (Dept. of Economics, University of Hawaii at Manoa Honolulu, HI 96822) will study the relation of telecommunications information infrastructure to economic development in the Pacific, and telecommunications in relation to foreign earnings and balance of payments in developing countries. He has written *INTELSAT's Economic and Institutional Challenges as an International Organization* (Baden-Baden: Nomos Verlag, forthcoming).

Dr Gerald Sussman (Dept. of Political Science, Ohio University, Athens, OH 45701) studies the political economy of Third World information technology infrastructure with emphasis on a new international division of production and labour. With Prof. John A. Lent (Dept of Journalism, Temple University) he is preparing a book on the industrialization of communication in S. E. Asia.

WEST GERMANY
Prof Gerd Kopper (Institut für Journalistik, Universität Dortmund, Postfach 50 05 00, 46 Dortmund 50) chairs the Research Commission of North Rhine Westphalia on Evaluation of Cable Pilot Projects and Telecommunications Development and is involved in European and German ISDN research.

Prof Herbert Kubicek (Universität Trier, Postfach 3825, 5500 Trier) and Dr Barbara Mettler-Meibom (Institut für Politische Wissenschaft, Von-Melle-Park 15, 2000 Hamburg 13) study ISDN policies and policy alternatives in North Rhine Westphalia.

Prof. Ernst J. Mestmäcker (Max-Planck Institut für Ausländisches und Internationales Privatrecht, Mittelweg 187, D-2000 Hamburg 13) directed an international project on The Law and Economics of International Telecommunications. The various sections of the project are listed under individual researchers: in Canada, India, Netherlands, and the USA. He has also edited *The Law and Economics of Transborder Telecommunications: A Symposium* (Baden-Baden: Nomos Verlag, forthcoming).

Werner Neu (Wissenschaftliche Institut für Kommunikationsdienste, Postfach 2000, 5340 Bad Honnef) studies emerging market structures in the telecommunications equipment and information technology industries.

Bernhard Wieland (Staatswissenschaftliches Seminar, Universität Köln, Albertus Magnus Platz, 5000 Köln 41) studies the regulation and competition policy in telecommunications and telecommunications policies in different countries.

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National Telecommunications Policies

Beesley, Michael E. *Liberalisation of the Use of British Telecommunications Network*. London: HMSO, 1981. 52 pp. He argues for the introduction of competition into the British telecommunications system. Influential in shaping the content of subsequent legislation.

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Eward, Ronald. *The Competition for Markets in International Telecommunications*. Dedham, MA: Artech House, 1984. 190 pp. A review of current and prospective telecommunications policies in 17 countries with regard to the possibilities of competitive market access for US firms.

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Competition in International Telecommunications

Colino, Richard R. 'Global Politics and INTELSAT: The Conduct of Foreign Relations in an Electronically Interconnected World', *Telecommunications Policy*, 10 (3) 1986, pp. 195-209. The former Director General of INTELSAT argues that breaking the INTELSAT monopoly will be globally divisive, harm the Third World and boost the rival INTERSPUTNIK.

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