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**"LEO, MEO, or GEO?":
A Political Economic Analysis of
Global Mobile Satellite Services**

by
Lewis Kaye, B.A.

A thesis submitted to
the Faculty of Graduate Studies and Research
in partial fulfillment of
the requirements for the degree of

Master of Arts

Communication Program
School of Journalism and Communication

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Carleton University
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**"LEO, MEO, OR GEO?":
A Political Economic Analysis of
Global Mobile Satellite Services**

**submitted by Lewis Kaye, B.A.
in partial fulfilment of the requirements for
the degree of Master of Arts**

Thesis Supervisor

Chair, School of Journalism and Communication

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Abstract

My thesis proposes to critically explore issues raised by the coming implementation of global mobile satellite services (MSS). These proposed telecommunications systems intend to offer personal telecommunications services from any point to any other point on Earth. This investigation is informed by the theoretical perspective of the political economy of communications, and its intention is to contextualize MSS (as a concept, as well as a technological system) within an understanding of a deepening global capitalist economic order. This thesis utilizes a new framework for the political economy of communication proposed by Vincent Mosco (forthcoming). Three fundamental processes of social life are foregrounded: commodification, spatialization, and structuration. These processes provide the lenses through which MSS will be examined and the principle by which this thesis is organized.

Acknowledgments

This thesis was perhaps the most difficult, and rewarding, single project I have ever completed. While it bears my name, in many ways it was not solely an individual undertaking. At an academic level, I would like to thank David Walker and Ted Magder, two undergraduate professors of mine who helped inspire me to pursue graduate studies in the first place. I would also like to thank Eileen Saunders and Jay Weston, who both helped make me think. Special thanks to Joanne Marshall, a wonderful teacher and someone who kept me focussed on the important questions -- the simple ones. Lastly, this thesis would not have been possible were it not for the support and encouragement, not to mention the intellectual work, of my supervisor, Vincent Mosco. The opportunity to work with Vinny is one that has greatly benefitted me, both at a personal and scholarly level, and I could do nothing but my best work under his supervision.

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Introduction

If one considers the notion of universal telecommunications service in its most absolute and technical sense, one is faced with the prospect of a network that could connect a person from any place in the world to any other place in the world. This vision would constitute the ultimate telephone network, capable of offering advanced telecommunications services to anyone able to pay the bill, regardless of location. Historically this goal has not been technically feasible; telecommunications networks have been unable to overcome certain physical limitations, such as the need for a cabled or cellular radio infrastructure, or fixed satellite earth stations. Yet recent advances in technology have enabled several large, transnational corporations to put forward proposals for the establishment of global mobile satellite services (MSS). These systems intend to provide direct-to-satellite communications (i.e. with the capability of bypassing terrestrial networks) from hand-held, cellular-style telephones, thus enabling the above scenario of any-point to any-point global communications. MSS, while in no way replacing existing telecommunications infrastructure, serves to "close the loop", providing service to areas formerly unserved or underserved. Since traditional telecommunications systems have long been seen as worthy of academic investigation, MSS promising a fundamental extension of traditional satellite and land-based telecommunications, represents an important and timely object for intensive critical investigation. This is the basic purpose underlying this thesis.

The title of this thesis, "LEO, MEO or GEO?", is taken from the title of an article which appeared in the October 1993 issue of the satellite industry journal *Satellite Communications* (Hess, 1993). Its use here is meant to suggest two things. First, the intentionally careless use of these acronyms - LEO, MEO and GEO standing for low earth orbit, medium earth orbit and geosynchronous earth orbit respectively - symbolizes much of what is wrong with the current debate

surrounding MSS. This debate is to a large degree characterized by an excessive focus on the technical features of these systems. Little is written about the potential social implications of the technology. What is often found is material written by managers of MSS firms, and which reads much like a marketing brochure. Secondly, the actual question posed in the title – IFO, MFO or GFO? – suggests that the implementation of MSS is a fait accompli, the only questions left to decide being technical issues regarding system configuration. Absent are the questions of who really needs MSS and who will likely benefit from its utilization. The first sentence of Hess' (1993) article neatly encapsulates the problem with current mainstream debate, "The advent of the hand-held satellite telephone will be the realization of one of mankind's [sic] ultimate dreams – the ability to communicate instantly and effortlessly to and from any place on earth." (Hess, 1993: 42) Rhetoric such as this is all too common, and in effect represent part of the myth-making of the information age. These myths must be challenged.

When considering the value of taking MSS as an object of analysis, one must look at the crucial role played by telecommunications in the constitution of the modern, capitalist society. The most popular, and also perhaps the most misunderstood, enunciation of the power of telecommunications can be found in the work of Marshall McLuhan. The idea of the "global village", while used by McLuhan no doubt as a broad and vague metaphor, is almost literally applicable when one considers MSS. Chandler (1977), among others, has forcefully argued that telecommunications early in this century facilitated what he called a "managerial revolution" within American business, which fundamentally changed the nature of corporate and other forms of bureaucratic organization. Telecommunications development has also been considered by many liberal

scholars as a necessary prerequisite for economic development, particularly with respect to the Third World. Thus a critical discussion of MSS, particularly with respect to the Third World, is crucial not only due to the scope of this particular system, but also due to the importance of understanding telecommunications in general as a social agent.

The objective of this analysis of MSS is threefold. First, I hope to explore the empirical issues directly related to the implementation of this new technology, such as deregulatory influences that competing MSS providers may have on state telecommunications policy. A fundamental question is whether MSS can be considered as a factor assisting the process of international structural change. Another issue is the consideration of MSS as a telecommunications service. For instance, MSS implementation is justified by its supporters through a reliance on market-based philosophies that also give rise to current "deregulatory" trends in telecommunications in general. We see a shift away from the considerations of telecommunications as a public good, and consequently a shift away from social considerations of telecommunications. MSS, being completely private global communications networks, potentially free the providers from any form of social oversight and thus any form of social responsibility. We can also ask whether MSS is representative of the deepening commodification of telecommunications services.

Another important question is who is MSS intended for. Exploration of this question will involve an investigation of the main instigators behind and beneficiaries of MSS, as well as advanced telecommunications services in general. It is my belief that those who will most benefit from this technology are large corporate users, and global business in general. We must also consider the potential influences MSS may have on corporate organization and activity. MSS

has also been touted as a form of "instant infrastructure" for the developing world, and has gained considerable support from some in these regions for just this reason. Thus we must also look at where in the developing world this support is coming from. It is my contention that support is coming from those groups in the Third World that are in the best position to take advantage of new business opportunities enabled by MSS: the internal capital classes of these regions. An intimately related question is what is MSS to be for. I am proposing that MSS can be seen as an agent in the spatial extension of global capital.

Second, I hope to demonstrate the effectiveness of a political economic approach to the study of MSS. In order to fully understand the issues raised by MSS, I believe it is necessary to situate MSS within the overarching context of the global capitalist economic order. Political economy in general offers the most appropriate theoretical framework from which to understand the social, economic and political implications of MSS. It also offers a theoretical approach that fits well with my personal world view. The underlying sense of moral philosophy implicit in much critical political economy, as well as its commitment to social justice, make it an attractive theoretical framework from which to divine many potential implications of this new technological system. These loci lead to a foregrounding of issues of power, what constitutes meaningful power, and the distribution of power throughout the social totality. The concept of power here is taken out of its traditional definitions, which tend to focus on diplomatic, military or crudely economic conceptions, and is expanded to include ideas such as race and gender, as well as considering economic power in ways that transcend the equations and formulae of classical economists. By analyzing MSS through this lens, I hope to keep these issues central, and to view MSS as a value-laden agent

of change, rather than a neutral technology that can be nothing but beneficial to global society.

Lastly, I hope to demonstrate the effectiveness of a new political economic methodology recently articulated by Vincent Mosco. This framework proposes the utilization of three broad social processes as a basis for political economic analysis: commodification, spatialization and structuration. His framework is based in an understanding of society as a dynamic social totality, rather than focused on the institutional relationships which much of traditional political economic literature explores. Mosco also incorporates a fundamental belief in human agency, getting away from some of the deterministic tendencies inherent in much Marxian analysis. It also offers a useful cognitive map, providing an effective means by which to think about political economy, and incorporate the many of the existing insights of a vigorous body of intellectual work. As a newly articulated approach, the chance of testing this hypothesis offers me a wonderful personal opportunity. However, the opportunity afforded me would not be meaningful if this framework was not appropriate for the task at hand. It has long been my belief that political economy offers an excellent way of understanding the sphere of telecommunications, through its emphasis on structural power relationships. The implications of MSS must be contextualized within the myriad other forms of power relations extant in society.

The first chapter of this thesis lays out the object of analysis. A brief discussion of the general characteristics of MSS is then followed by an outline of some of the specific features of certain systems. The emphasis is on providing an accessible technical description, free from as much jargon as possible. It is my belief that any analysis of a technology, critical or otherwise, must be grounded in an understanding of the capabilities and limitations of that technology. This

does not mean that one should be carried away by technical descriptions. On the contrary, this can lead to an undesirable situation where debate over the nature of the technical features supplants a substantive focus on the social implications of the technology. What results is often an analysis that is rendered crudely technologically deterministic: the solutions to social problems that may arise are to be found in alternative technical configurations.¹ This chapter concludes with a consideration of the history of international satellite telecommunication, the intent being to situate MSS within the historic trends of the industry.

The second chapter provides the theoretical context in which MSS is to be considered. Again, situating MSS historically, this time with respect to international communications theory, is a prime goal. The chapter begins with an explication of what has historically been considered the dominant paradigm of international communications theory -- development or modernization theory. Often we find that MSS rhetoric finds an implicit justification in the assumptions that ground this theory. We move on to explore two important critiques of development theory: dependency theory, and what I term traditional political economy. While both offer important insights into the shortcomings of the dominant paradigm, they suffer from theoretical shortcomings that make these approaches unsuitable for a comprehensive critical analysis of MSS. It will be argued that a new framework for the political economy of communications articulated by Vincent Mosco (forthcoming) provides a better means by which to engage in this analysis. This framework is based in a consideration of three primary processes of social life - commodification, spatialization, and

¹ An example of an analysis that suffers from just such a focus is Mansell (1993). While well intentioned, this analysis of the new telecommunications relies on an approach that excessively considers the technological features of network design. Proprietary network features are seen as privileging the interests of certain network providers, and that this problem can be effectively addressed by open network protocols. While no doubt true to a degree, the analysis is devoid of any consideration of the *social*, as opposed to technological, barriers to network access.

structuration – and it is the consideration of MSS as respects these processes that will constitute the substantive analytical part of this thesis. The following three chapters will in turn take up each of these three processes.

Chapter three involves the analysis of MSS through consideration of the process of commodification. It begins with a discussion of the concept, and proceeds to apply it to the realm of telecommunications in general. This is done in order to provide a current context for the consideration of MSS. This new technology must be seen in light of current developments in telecommunications and informatics. Two essential dimensions of commodification are explored: the means by which communication technologies facilitate the process of commodification in the wider political economy, and the influence of commodification on the processes of communication. What we see is an area of social life more and more subject to the imperatives of market capitalism. The essential question here is whether telecommunications constitutes a public space, and if so, what are the implications of what amounts to the commodification of this space.

The fourth chapter addresses the process of spatialization. This chapter focuses on the potential of MSS to transform spatial and temporal relationships. As a technology that technically can provide globally ubiquitous telecommunications services, any comprehensive analysis of MSS must include considerations of spatialization. Space is not seen in a passive sense, but as being an actively constructed feature of social life, fundamentally constituted through the power relations that characterize social relationships under capitalism, and often times physically linked through space by telecommunications. The analysis begins by analyzing the implications of MSS for the flexibility of spatial organization of individual firms; what can essentially be considered a micro level

analysis. It then proceeds to explore mezzo and macro levels of social life, beginning with inter-firm activities, then industry-wide dynamics, and finally with a consideration of how MSS plays into the spatializing dynamics of states.

The final analytical chapter explores the relationship between MSS and the process of structuration. The concern is in seeing MSS in relation to the wider sphere of social practice and transformation. Key here is the consideration of the social relations of hegemony; specifically, how MSS relates to notions of an emerging information society. While much MSS rhetoric focuses on the ability to deliver the information age to all parts of the planet, I argue that this vision is grounded in simplistic geographical notions of universal service, visions that represent a fundamental rearticulation of the socially and politically defined concept that finds itself embodied in much Western telecommunications policy. What we are seeing in a sense is the rearticulation of an arguably hegemonic concept – universal service – made possible through the agency of capital as expressed through transnational corporate enterprise. It is important that society move towards considerations of what constitutes *meaningful access*. The chapter concludes with a brief discussion of MSS, surveillance, and the process of individuation.

As a student of communications concerned with issues of social equality and justice, this thesis represents an attempt to consider a new telecommunications technology through the lens of meaningful access. It is not sufficient to thoughtlessly embrace new communications technologies simply because of the advanced capabilities offered to those able to make use of them. It is necessary to critically situate a technology such as MSS within the social dynamics of the capitalist society in which we live. Only through an analysis such

as this can we move towards a consideration of how a technology such as MSS will truly manifest itself.

Chapter 1

Describing MSS

Before we delve into a substantive analysis of the implications and rationales of global mobile satellite services (MSS), it is important to investigate the physical and technical characteristics of these systems, as well as review some of what has already been said about MSS. In this regard, this chapter attempts to spell out, in as simple and non-technical terms as possible, what distinguishes MSS from existing satellite telecommunications. We must consider the general features of all pertinent global MSS systems² in order to identify a coherent and unified object of analysis. Yet we must also draw out the distinctions between the many different MSS proposals. This must be done in part to ascertain the different organizational structures required by each system. The differing technical characteristics of these services will also have ramifications on the flexibility, quality and type of services offered by the various providers, as well the question of how each service will coexist or compete with existing terrestrial services and providers. While this thesis intends to emphasize MSS in a unified sense, acknowledging the differences between the systems will help to ascertain the full range of potentialities for MSS.

It is also important to situate MSS within the historic context of global satellite telecommunications. It is necessary to identify how MSS differs from traditional fixed and mobile satellite services in order to think about how MSS will eventually compete and coexist with these services. By examining current institutional and regulatory frameworks for satellite telecommunications, we will be able to gain insight into the potential transformative influences MSS may hold for these structures and institutions. We must thus consider the principles that underlie these various systems. Issues of spectrum allocation must also be taken

² This thesis proposes to analyze *global* mobile satellite services, which can be distinguished from regional MSS systems, such as that proposed by AMSC. This company intends to serve North America and the Caribbean basin (see Schneiderman, 1994: 57-8; Johanson, Davies and Tisdale, 1993).

into account. At the international level this is decided through the International Telecommunication Union (ITU), a United Nations agency. Allocations for MSS were made at both the World Administrative Radio Conference of 1992 (WARC '92) and the World Radio Conference of 1995 (WRC '95).

From here, we can proceed to an investigation of what has already been written about MSS. Much of this writing contains implicit assumptions about the role of MSS within the "new, global information society." As we shall see, the literature often focuses on the regulatory "hurdles" that might limit the implementation of MSS, or on developmental rhetoric associated with the adoption and use of MSS. We must draw out the theoretical assumptions that underlie this literature, but are rarely, if ever, explicitly stated. By doing this, it is hoped that the groundwork will be laid for a sound critique of MSS.

General Characteristics of Global MSS

The global mobile satellite systems considered here are essentially networks designed to provide wireless telecommunications services to and from any spot on the planet through the use of hand-held terminals and dedicated satellite networks. As opposed to traditional forms of satellite telecommunications, MSS offers "lower cost, portable phone and data terminals and less expensive communications charges...." (Hess, 1993: 42) MSS is first and foremost a "personal" satellite communications system. Flower (1993: 77) has quaintly described these networks as "a cellular system with very tall towers called satellites." These systems all involve networks of multiple satellites, or constellations. The coverage areas of each satellite, their footprints, overlap to provide a network that can cover the entire planet. While the number of

satellites in each constellation, and the altitude of their orbits, differ from proposal to proposal, the key similarity is their ability to provide telecommunications services from any point to any point. They are distinguished from existing mobile satellite services by their utilization of hand-held terminals; essentially high-powered digital cellular-style phones.³

While MSS as a whole is generally distinguished through its scope of coverage, the technical characteristics of each individual system can allow one to subdivide these proposals. Individual systems can be grouped according to features shared with some systems but not others. A first defining feature is that of orbital altitude. All MSS systems can be roughly classified as either low Earth orbiting (LEO), medium Earth orbiting (MEO), or geosynchronous Earth orbiting (GEO).⁴ The distinctions between these orbits are best illustrated by considering the three options investigated by Inmarsat for their proposed Project 21, each of which explored a different orbital configuration. The GEO option called for satellites placed in a geosynchronous orbit of 36,000 km. MEO options called for satellite constellations of between 9 and 15 spacecraft orbiting at 10,000 to 15,000 km. The LEO alternative involved a satellite system of 54 spacecraft orbiting at an altitude of about 1,800 km. (Hess, 1993: 42) While the intended services of all

³ The International Maritime Satellite Organization (Inmarsat) has been offering mobile satellite services since the 1970s, however this has been accomplished through the use of relatively large, albeit still portable, earth terminals. The most portable of all existing Inmarsat services is Inmarsat-M. According to David Wright, Inmarsat's Manager of Regional Programmes, "the Inmarsat-M mobile earth station ... comes in a briefcase, typically weighing 7-8 kg. [and] ... provides voice, data and fax." (1995: 106) Wright goes on to note that as of November, 1994, these terminals cost around \$12,000 each, and per-minute charges for usage are around \$4, with charges even higher in some countries. Thus this system is substantially more costly and unwieldy than any proposed MSS system. It should also be noted that Inmarsat has historically focused on providing service to ships at sea and islands isolated from existing telecommunications networks through their geographical location.

⁴ Certain medium Earth orbits are more specifically referred to as intermediate circular orbits (ICO). While named after this orbital configuration, we must be careful to distinguish between the general orbital configuration and the corporate name of Inmarsat's privatized MSS project, known as ICO Global Communications (ICO). References to ICO in this thesis are to this particular project, unless otherwise noted.

MSS providers are similar, the choice of orbital altitude has profound technical implications. For instance, LEO systems, as evidenced in the Inmarsat example above, require a substantially higher number of satellites than either MEO or GEO systems. This is due to the fact that a satellite with a higher orbit gains a larger footprint, meaning fewer MEO or GEO satellites are needed to effect global coverage.⁵

Another factor directly related to the choice of orbit will be the usable lifespan of each satellite. A lower orbit will necessarily mean a shorter expected lifetime for each individual satellite, in relation to MEO or GEO satellites. In his comparison of Iridium (a LEO system), Globalstar (another LEO) and Odyssey (a MEO system), Comparetto noted that Odyssey satellites are expected to enjoy a 10 year lifespan, as opposed to 7.5 years for Globalstar satellites and 5 years for Iridium satellites. (1993:100, Table 2) This will have important implications for system maintenance, requiring LEO vendors to deploy replacement satellites at a faster rate than their GEO or MEO counterparts. Needless to say, deploying satellites is not an inexpensive proposition. Thus we can also reasonably conclude that the initial deployment costs will also be higher for LEO systems, due to the fact that there are more satellites to launch.

LEO systems may also suffer from relatively poor availability in relation to MEO and GEO systems. Availability in this sense refers to whether calls can be "established and maintained when blockage is present in the user's local environment." (Sandrin and Haschart, 1993: 237) Blockage refers to topographical features such as a built up, high-rise urban environment, mountains or other landscape features that might interfere with the connection

⁵ A GEO system will thus require less satellites than a MEO system.

between an MSS user and the nearest available satellite. In their comparison of availability predictions between LEO and ICO systems, Sandrin and Haschart conclude that ICO systems will generally have a better level of availability than LEO systems due to the fact that "ICO satellites tend to remain at higher elevation angles for a greater percentage of the time." (1993: 264)⁶ Comparetto comes to a similar conclusion stating, "The higher minimum elevation angle for Odyssey could result in a more uniform level of performance, especially in metropolitan and mountainous regions." (1993: 100) In other words, MEOs (or ICOs) are higher in the sky than LEOs, and stay there for a relatively longer time, thus facilitating easier access to or from a user's terminal to a satellite. This may have important implications for the level and quality of service offered by each MSS vendor.

LEO systems do offer some benefits as opposed to MEO or GEO systems. The most important, and perhaps the most apparent to potential MSS users, is the connection time, or the time it takes to access a satellite in order to place a call. Comparetto notes that the average connection time for a call made through the Odyssey system is 2 hours, versus 9 minutes for Iridium and 10-12 minutes for Globalstar. (1993: 99, Table 1) Generally speaking, the lower the orbital altitude, the faster the connection time. LEO satellites are also often smaller and less expensive than MEO or GEO satellites. The lower power requirements of LEO satellites make it possible to use these smaller satellites.⁷ Thus, while we noted the drawbacks associated with the shorter lifespan of LEO satellites with respect to MEO or GEO spacecraft, this may in turn be offset by lower

⁶ The elevation angle refers to the degree a satellite is elevated from the horizon. The higher the elevation angle, the farther the satellite is from the horizon and hence the higher it is in the sky.

⁷ Power requirements are smaller for LEO systems because of the much shorter distance between the satellite and the person placing the call. Consequently, GEO satellites are larger and higher powered than MEO satellites.

construction costs of LEO satellites, as well as lower launch costs due to the lighter payload.

A distinction should also be noted between what have become known as "little LEOs" and "big LEOs." This distinction does not refer to the size of the systems, or of their satellites, but to the portion of the spectrum being utilized and the services being offered. "Little LEOs" are systems that intend to operate below 1 GHz (gigahertz) and will "be used primarily for low data-rate communications, such as messaging and position location, to handheld receivers." (Manuta, 1992: 27) "Big LEOs" are to operate above 1 GHz, and intend to offer a much wider range of services, including voice telephony. While both systems can be called MSS, this thesis intends to focus on these "big LEO" services: mobile services offering voice telephony. Having outlined the general characteristics of this technology, we must now turn to a specific examination of several major MSS proposals. By doing so, we can move beyond the simple technical outlines of these systems and begin to investigate the organizational and marketing strategies, among other features, that underlie these proposals. We will begin by examining what is perhaps the best known MSS proposal, Iridium.

Iridium

The first, and one of the most ambitious, "big LEO" MSS proposal was the Iridium system. Developed by Motorola, a firm with a long history in the development and manufacture of microelectronics, Iridium was first unveiled on June 26, 1990. The initial proposal called for a constellation of 77 satellites, and it was from this that the project derived its name; iridium being the element with

77 orbiting electrons. Since this initial announcement, the system has been redesigned, and now plans to use of 66 satellites.⁸ Original estimates carried a \$2.1 billion U.S. pricetag, with operation expected to begin fully in 1996. However, this initial figure has been revised upwards to \$3.37 billion U.S., with the first launch dates scheduled for January, 1997. (Manuta, 1995a: 34) Due to the extremely high costs of this program, it is highly unlikely that Motorola ever intended to fully fund Iridium on its own. Indeed, as Schneiderman (1994: 61) notes, "In October, 1992, Motorola decided to sell 85 percent of the common stock in Iridium, Inc., the Washington, D.C.-based unit set up to manage the mobile satellite network. The stock sale was to occur in private transactions with both U.S. and foreign telecommunications companies." Recent events see Iridium selling shares to government agencies (Bloomberg, 1995).

While the decision to sell ownership shares in Iridium to other telecommunications firms was partly motivated by the practical considerations of funding the project, it is likely there are other factors involved. Iridium was initially designed and proposed as a stand-alone network. The system incorporates inter-satellite links, meaning the satellites can pass a call from one satellite to another. In effect, a call made from one Iridium user to another need not be routed through existing terrestrial networks.⁹ This initial vision of Iridium thus represented a direct threat to established terrestrial fixed and mobile telecommunications providers by calling for a system capable of totally bypassing them. Motorola, it must be remembered, is a major supplier of

⁸ Despite this, there are no plans to change the name to dysprosium, the element with 66 electrons. As Flower sardonically points out, "Dysprosium doesn't have the same ring, and its root meaning is 'bad approach'" (1993: 74). Whether this foreshadows the future for Iridium, only time will tell.

⁹ In other words, an Iridium call placed from North America to Africa (for example) could feasibly proceed from the ground in North America to the nearest satellite, which would then pass the call to another satellite, which would pass the call to another satellite, etc. until it reached a satellite capable of directly reaching the destined caller.

equipment to cellular providers around the world. Thus Motorola has modified its initial plans for Iridium, incorporating links with terrestrial systems which are to be administered by regional Iridium investors.¹⁰ By October of 1993, Iridium had obtained cash and commitments of \$800 million U.S. Investors with existing telecommunications interests included BCE Mobile of Canada; Muidiri Investments BVI, Ltd., a consortium of Venezuelan investors; Sprint Corp. of the U.S.; the Malaward Group of Saudi Arabia; Nippon Iridium Corp., a consortium of 18 Japanese firms including Sony, DDI¹¹, Mitsubishi and Kyocera; STET of Italy; Pacific Electric Wire & Cable Co. Ltd., of Taiwan; and United Communications Industry Co. Ltd., a cellular and paging firm in Thailand.¹² (Marek, 1993: 12; Schneiderman, 1994: 61-2) Iridium was granted one of three "big LEO" licenses by the FCC in January, 1995. As of April, 1995, Iridium had signed launch contracts for the last quarter of 1996 with McDonnell Douglas launching the satellites aboard their Delta II rockets from Vandenberg Air Force Base. (Ayer, 1995a: 35)¹³

¹⁰ According to Flower (1993: 75):

Motorola's Iridium phone has become, like all the other systems, dual mode. When you turn it on it's just a cellular phone. Only if no cellular net is available, or if you push the phone's satellite button, does it hook into the satellite system. So Motorola had its hands full with a major shift in strategy, first assuring PTTs around the world [Motorola's major customers and potential or actual Iridium investors] that it never meant to steal their revenues. ... Then saying, "wanna be a partner?"

See also Hartshorn (1992: 16)

¹¹ Illustrative of Flower's point stated in the previous footnote, Schneiderman (1994: 62) notes that "DDI Corp., Japan's largest private long-distance carrier ... and its regional cellular phone subsidiaries ... use Motorola cellular equipment almost exclusively."

¹² Industrial partners (that is, firms who are to assist in the development and deployment of Iridium) include British Aerospace, Deutsche Aerospace, General Electric, Lockheed, Raytheon, China's Great Wall Industry Corp., the Russian Federation's Khrunichev Enterprise, McDonnell Douglas and Matra Marconi (Marek, 1993: 12; Schneiderman, 1994: 61-2; Ayer, 1995: 34). It is interesting to note that this list reads like a who's who of Cold War military contractors.

¹³ The Great Wall Industry Corp. of China and Russia's Khrunichev Enterprise are also to launch Iridium satellites.

With respect to marketing strategy, Iridium is clearly designed as a premium service geared towards those who desire consistent global telecommunications access. Iridium managers have been quite explicit about this: Jerrold Adams (1994), former president and CEO of Iridium Inc. has stated "The biggest market is the worldwide business traveler who today is in need of wireless, personal phone service once he/she leaves the home service area." This focus is not surprising when one considers the estimated \$2500 U.S. cost for handset terminals, and a typical service cost of approximately \$3 U.S. per minute,¹⁴ making Iridium the most expensive MSS proposal in terms of cost to the end user. Adams also notes other potential customers being "industrial users operating in remote areas." Thus we see evidence of marketing strategy emphasizing service complementary to existing terrestrial networks. An early description of Iridium given by Bary Bertiger, assistant general manager of satellite communications for Iridium, also points to this complementary strategy, yet with a somewhat different emphasis. He states:

Though there is obviously a service similarity between the service offered by Iridium and terrestrial cellular, Iridium, because of its limited capacity and cost structure is not designed to compete with, or replace, existing landline or cellular systems. *Instead Iridium will target markets not currently served by mobile communications services.* We instance:

- (1) sparsely populated locations where the demand is insufficient to justify constructing a terrestrial telephone system;
- (2) areas in developing countries with no existing telephone service; and
- (3) small urban areas that currently lack a terrestrial mobile communications structure. (1991: 40, emphasis added)

It is interesting to note how Iridium marketing strategies have changed over time, as well as to consider themes that have stayed somewhat consistent.

¹⁴ Adams points out in the same interview that Iridium's inter-satellite links may obviate the need for calls placed through Iridium to be routed through terrestrial networks, thus these calls will not incur the same level of terrestrial long-distance charges as calls placed through other MSS systems. However, it should also be noted that these cost estimates do not include any monthly subscriber-type fees.

For instance, Bertiger's claim of Iridium serving areas in the developing world seems to receive less emphasis in the strategy spelled out by Adams. Yet when one examines the "complementary" nature of Iridium in this light, it appears to apply only to areas already well served by terrestrial networks: the developed world. How can Iridium complement services that do not exist? Thus Iridium may be intended to circumvent the need for terrestrial telecommunications development in the Third World. We might also conclude that those most likely to benefit from Iridium are "the international business traveler" or industries with operations in remote areas. It might also be suggested that the actual strategies foregrounded change with the context they are found in. Adams comments, for instance, are found in the industry journal *Satellite Communications*, while Bertiger's are found in more academic journals such as *Intermedia* and *Telecommunications Policy*. It is apparent contradictions such as these that speak to the need for a critical examination of MSS.

ICO Global Communications

As noted earlier, land mobile satellite services already exist, offered by the International Maritime Satellite Organization through its Inmarsat-M service. However, Inmarsat does plan to get involved in this new generation of MSS, through its spin-off ICO Global Communications (ICO), established in September 1994 (ICO Global Communications, 1996*).¹⁵ Inmarsat appears to be well placed to enter the MSS market, having almost two decades of experience in operating mobile satellite systems of various descriptions, and a signatory base

¹⁵ Before being spun-off by Inmarsat, this system was known as Project 21 or Inmarsat-P. The asterisk in the citation is used because the date given represents the date of the document's retrieval from the Internet, not the date of publication, for this was not given.

of 67 countries. It is in this latter feature that Inmarsat differs fundamentally from the other proposals: Inmarsat is an international treaty-based organization whose signatories are the designated representatives of states, rather than self-interested private corporations. As noted earlier, Inmarsat considered all three orbital configurations (LEO, MEO and GEO) for Project 21, deciding on, as the corporate name suggests, an intermediate circular orbit configuration consisting of a ten-satellite constellation (ICO Global Communications, 1996*). With respect to the services to be offered, ICO was initially proposed as a voice telephony service. However, "Inmarsat Director General Olaf Lundberg suggested that Project 21 could be extended to other applications; 'for instance, entertainment communications centers for your car, personal satellite navigation, position-reporting, and alerting services for your security.'" (Schneiderman, 1994: 67) Thus we see the potential broadband applications for MSS; applications that would most likely be available from all MSS providers.

ICO has engendered fierce criticism from many other MSS backers. They see Inmarsat's position with respect to mobile satellite services as inherently privileged, due to the organization's treaty status. This has meant, among other things, that Inmarsat has been exempted from paying taxes in the states it operates within. Concretely, this opposition has manifested itself in petitions to the FCC by TRW Corp. (the main proponent of the Odyssey MEO system) and to the executive branch of the U.S. government by Iridium demanding that they prevent Comsat, the U.S. signatory to Inmarsat, from participating in ICO.¹⁶ The veracity of these claims is indeed questionable. The claim that Inmarsat is in a privileged position with respect to Motorola, for example, is extremely dubious.

¹⁶ TRW's position here is quite interesting when one considers that TRW was awarded an initial contract by Inmarsat to study the feasibility of a MEO configuration for Project 21. (see Saunders, 1995; Schneiderman, 1994: 66)

For instance, Schneiderman (1995: 69) notes that Inmarsat is already forbidden by the FCC from offering land mobile services within the U.S., a restriction Iridium will unlikely face. As well, it is difficult to see how Inmarsat could influence market access restrictions in many countries more effectively than Motorola, for as Schneiderman also points out, "... the total retail sales value of all Inmarsat partnership services in 1992 was projected at only \$600 million [U.S.], or about 1/24 the size of Motorola." (1994: 68 emphasis added).

These claims have, however, served to fuel a debate, at least within the United States, about the need to privatize Inmarsat. The FCC has recently asked Congress to rewrite the *Communications Satellite Act* of 1962, which governs Intelsat, Inmarsat and Comsat. In a report entitled *Reinventing Government*, the FCC puts forth the idea that Congress "could promote worldwide competition by privatizing Intelsat and Inmarsat, eliminating their privileges and immunities and special access to spectrum and orbital slots." (Manuta, 1995b: 14) The Commission may be referring both to competition with foreign firms and competition throughout the world between American firms. With the spin-off of ICO, this debate seems to have had an effect on Inmarsat's organizational structure. This does not seem to be enough for some U.S. analysts. According to Rodriguez (1995: 32):

The United States must ensure that "privatization" does not result in less government oversight and continued privileges and immunities. Inmarsat has recently demonstrated how it can benefit from the best of all worlds by creating a quasi-private affiliate [a reference to ICO] while preserving most of the benefits of government protection. This is not privatization.

Why ICO is seen as quasi-private or its "preserved benefits", however, go unmentioned.

The cost of ICO is estimated at \$2.6 billion U.S., making this one of the most expensive MSS proposals on the table (ICO Global Communications, 1996*). As of March 1995, "More than thirty-eight Inmarsat signatories, including ... Comsat, have pledged to invest \$1.4 billion [U.S.] in the venture. Inmarsat, the treaty organization as a whole, has pledged 15 percent of the total investment, or \$150 million [U.S.]. Each of Inmarsat's member nations is therefore an indirect investor via the Inmarsat investment." (Saunders, 1995) The goal of ICO is to be able to offer the same level of service as Iridium for under \$1 U.S. a minute. Service is not expected to begin until 2000.

Teledesic

Teledesic, a system proposed by Microsoft's Bill Gates, and Craig McCaw, founder of McCaw Cellular, is a proposal fundamentally different from the two described above. Teledesic calls for a constellation of 840 LEO satellites, offering full broadband computer communications to anywhere on the planet. In a sense, it is what more typical global MSS proposals may evolve into over time. Announced in March 1994, Teledesic is perhaps the most ambitious of all current MSS proposals. Technically speaking, it is not even a mobile system; Teledesic requires users accessing the system to remain in a fixed location. The trade-off here, however, is mobility for bandwidth; Teledesic proposes to offer full broadband services capable of "transport[ing] information ranging from ordinary telephone calls to high-resolution computerized medical images and two-way video conferences." (Andrews, 1994)

The broadband capability of Teledesic is part of the reason why such a large constellation of satellites is necessary. The other factor is the proposed

frequency of 28 billion Hz. Extremely high frequency communication such as this is extremely sensitive to interference from atmospheric conditions such as rain. Thus "the satellites only work properly if they are almost directly over the person communicating on the ground." (Andrews, 1994) The most crucial implication of this is cost: Teledesic's initial pricetag was \$9 billion U.S., making this system far and away the costliest. The large number of satellites also make the implementation of Teledesic somewhat problematic. In order to get the system up and running by the scheduled date of 2001, if launches began now, it would mean deploying 160 satellites every year for the next 5 years, a feat never before accomplished. The frequency requirements of Teledesic, though different from that of the other MSS proposals, were nonetheless granted to them by the ITU at WRC '95 (Foley, 1996*).

Other Advanced Proposals - Constellation, Odyssey, Globalstar and Ellipso

Other systems warranting attention at this time are Globalstar, a joint venture between Loral and Qualcomm Corps., Odyssey, from TRW Corp. and Teleglobe, Constellation Communications, and Ellipso, from Mobile Communications Holdings Inc.¹⁷ Rather than provide detailed descriptions of these systems, as was done for Iridium, Project 21, and Teledesic, it is sufficient to provide a brief outline of their status. Two of these systems, Odyssey and Globalstar, have, along with Iridium, already been awarded licenses by the FCC to operate their systems. Constellation Communications and Ellipso, while not having their proposals rejected by the FCC, were not initially granted licenses

¹⁷ These systems warrant consideration at this time due to the relatively advanced stages of these projects. However, as we speak, more MSS proposals are being made, most notably AT&T's recent announcement of a twelve satellite MSS system. (see Markoff, 1995: D1)

due to the Commission's contention that their financing proposals were somewhat lacking. The FCC gave these firms one year to tighten their proposals (see FCC News Report IN 95-4). It is expected that the FCC will most likely grant licenses to these systems. Ironically enough, as of March 1995, neither Globalstar nor Odyssey had firm launch contracts, while Ellipso has.

Financing arrangements will of course vary from system to system. But it should be noted that none of these systems comes close to Iridium, ICO or Teledesic in terms of cost. All systems involve participation from corporations around the globe, a list that includes many of the largest aerospace and electronics firms. For example, Globalstar will see involvement of Hyundai Corp. of South Korea and Daimler Aerospace of Germany. Ellipso involves Westinghouse and Israel Aircraft Industries. Odyssey sees participation from Hitachi, Northern Telecom and Mitsubishi, among others. (see Manuta, 1995a) It should be noted that some firms are involved in more than one project; Harris Corp. is involved in both Ellipso and Odyssey; and while Telesat Canada is active in the Iridium consortium and Teleglobe is active in Globalstar, both of these firms are essentially controlled by Bell Canada Enterprise Holdings of Canada.

Current Context of Satellite Telecommunications

We must now turn to the consideration of the current global context of satellite telecommunications. This is necessary in order that we may more fully understand the potential implications MSS may have on the international regulatory environment for telecommunications, and the implications for states within this environment. This section will begin with a brief historical overview of satellite telecommunications, in order to divine the underlying rationales and

principles behind current global satellite communications networks, most notably the Intelsat system. MSS will then be briefly contrasted with this system to highlight what sort of institutional accommodation may be necessary in order for MSS to be realized. Also to be explored will be the spectrum status of MSS, and hence the role of the ITU in allocating spectrum. At stake here is essentially the question of whether MSS is a "paradigm-shifting" technology, requiring fundamentally different institutional arrangements than previous satellite systems.

Satellite communications has its origins in the Cold War between the United States and the Soviet Union. U.S. space policy is rooted in the response to the U.S.S.R.'s launching of its first Sputnik satellites, which took place in 1957. The so-called "Space Race" this began provides strong evidence of the strategic and military motivations behind early American space policy. As such, early American satellite development was strictly in the hands of the Department of Defense. This military focus was to shift somewhat in the early 1960s, with a recognition by some in the Kennedy Administration of the potential commercial applications of satellite technology.¹⁸ Communication applications were at the forefront of these perceived commercial uses. While experimental communications satellites such as SCORE and ECHO 1 were being tested between 1958 and 1960, "TELSTAR, the first true active communications satellite, was launched in 1962." (Jefferis, 1991: 14) The launching of TELSTAR also signaled the active entry of private corporations into the field of satellite communications: TELSTAR being built and launched by the Bell Telephone Co.

¹⁸ This potential was also recognized by Pres. Eisenhower. In a speech given on Dec. 31, 1959, Eisenhower emphasized the necessity of the early establishment of a commercial satellite communication system, both for American national interest and for the needs of international communication. (see Musolf [ed.], 1968: 17-19)

Satellite communications was formally institutionalized in the United States on August 31, 1962, when President Kennedy signed the *Communications Satellite Act*. This act brought into being the Communications Satellite Corporation (Comsat), which was intended as the primary instrument of U.S. satellite policy. Comsat was a political compromise, allowing for both private, corporate involvement and governmental oversight. (see Snow, 1984; Oslund, 1977: 167) The fundamental purpose of Comsat as a policy instrument was clearly stated in congressional hearings by McGeorge Bundy, an executive in the Kennedy Administration; "Comsat was created for the purpose of *taking and holding* a position of leadership for the U.S. in the field of international commercial satellite services." (cf. Pelton, 1974: 50, emphasis added) Thus the *Communications Satellite Act* can be seen as a policy directly and specifically designed for export, and it was the passage of this act that led to the first serious negotiations regarding the establishment of an international satellite system.

The first interim agreements establishing an international satellite communications agency were signed on August 20, 1964, bringing the forerunner of Intelsat, the Telecommunications Satellite Consortium, into existence. The permanent agreements formally constituting Intelsat were negotiated between 1969 and 1971, and came into force in 1973. (Snow, 1984; Thompson, 1991) According to Thompson (1991: 28-30):

These agreements established the International Telecommunications Satellite Organisation (INTELSAT) with a four-tier organisational structure. This is:

- [1] *An Assembly of Parties*: meeting of representatives of the governments that are Parties to the Agreement. ...
- [2] *A Meeting of Signatories*: composed of representatives of all Signatories (governments or their designated telecommunications entities) to the Operating Agreement. ...
- [3] *A Board of Governors*: composed of those Signatories whose investment shares, individually or in groups, are not less than a specified amount. This minimum share is determined annually by

the Meeting of Signatories, with the objective of maintaining a total of approximately 20 members on the Board. ... [And]
 [4] An *Executive Organ*: with a staff of about 900 including over 40 nationalities.

The executive Organ is headquartered in Washington, DC, and is headed by a Director General who is responsible to the Board of Governors for the day-to-day management and operation of INTELSAT.

As of December 1989, Intelsat had 119 signatories. (Thompson, 1991: 31-2) The essential feature to consider here is that Intelsat is an *inter-state, treaty-based* organization. Intelsat, by design, is an international organization incorporating the interests of its member states. While criticisms have been leveled against the organization for being too dominated by the developed world, and the U.S. in particular (see, for example, Schiller, 1992: 187-8), Intelsat is an association of sovereign states. As such, their voices are factored into the decision making calculus.

Private satellite organizations outside the purview of Intelsat have existed for some time. Examples include regional satellite systems such as the European Eutelsat system, and PanAmSat, a system that carries traffic across the Atlantic. However, MSS is the first system to be able to directly compete with Intelsat at the global level. With this in mind, it is interesting to consider the general shift in U.S. satellite policy away from Intelsat over the last twenty years or so. This shift can be seen from many angles: dilution of U.S. control over Intelsat¹⁹, the growing desire of multinational corporations for high-speed, private data networks; the increasing prevalence of free-market ideology, and justifications based on the belief that existing institutional arrangements are unable to quickly and effectively implement new technologies. Later directions in U.S. satellite

¹⁹ The United States initially controlled 61% of Intelsat shares by virtue of the fact that it was the primary user of the system. By 1986, this figure had shrunk to 25.6%. A member-state's Intelsat share ownership is based on its relative usage of the system.

policy (such as the Open Skies policy of 1972 allowing domestic American satellite services, or the Separate Systems policy of 1985 allowing private international satellite networks to be established), while indicating a commercial bias, still remained consistent with American treaty obligations under the *Intelsat Agreement*.²⁰ However one chooses to view the situation, it is clear that U.S. policy has shifted over time in favour of the interests of private satellite providers. When one considers MSS, it also becomes clear that all the justifications presented above can be applied to this new technology. As well, MSS competes directly with Intelsat's core operations, that being the satellite interconnection of public telephone networks. Thus we must consider whether MSS is fundamentally a paradigm-shifting technology, requiring a whole new set of institutional arrangements.

With respect to institutional arrangements, we must also consider the spectrum status of MSS. The initial spectrum allocations for MSS took place at the World Administrative Radio Conference of 1992 (WARC '92), held in Malaga-Torremolinos, Spain. The interests of MSS providers at WARC '92 were formally represented by the United States, as only states are recognized. According to Jan Baran, the U.S. ambassador to WARC '92, "the Conference was a major success for the U.S." (cf. Manuta, 1992: 26) Without detailing the specific allocations made, it can be said that the allocations for MSS desired by the U.S. were eventually granted.²¹ While there was some opposition to American demands early in the conference, most notably from developing states, this was eventually overcome by the American delegation. Manuta (1992: 28) notes:

²⁰ For instance, the Separate Systems policy, while allowing for private satellite networks, stipulated that these networks were not to carry public-switched message traffic. Thus these private networks could not be said to be competing with Intelsat's core operations, something barred through the *Intelsat Agreement*.

²¹ For an overview of spectrum allocations made at the WARC '92, see Manuta (1992) and Mohan (1992).

By the end of the Conference, the U.S. was able to convince many developing countries to support their LEO [i.e. MSS] proposals because "advanced technologies" in certain parts of the world were also "appropriate technologies" where traditional landline telephone service was either nonexistent or inadequate.

These decisions made at WARC '92 came into effect in 1993. As noted earlier, spectrum allocations for Teledesic were approved at WRC '95.²²

Technology, Deregulation, and Development: The Literature of MSS

We can now turn to some of what has been written specifically about mobile satellite services. This is necessary if we are to proceed to an examination of the underlying theoretical assumptions of those commenting on MSS. My explorations have found several predominant trends in this literature. First, we see an emphasis on the technological aspects of MSS: technical treatises, "celebrations" of this high technology, and debate about which forms of MSS are most feasible. There is also an emphasis on the developmental applications of MSS, particularly with respect to the Third World. This particular literature is often consistent with what has historically been written about the development potential of other forms of satellite telecommunications. Finally, there has been much consideration given to the regulatory context of MSS; specifically, the "hurdles" facing MSS, and the concurrent need for regulatory accommodation. Much of what has been written about MSS is found in industry trade journals, or academic journals focusing on satellite technology and applications. In sum, an examination of MSS literature leads one to conclude that a strong liberal bias underlies much of the writing.

²² This is the new name given to the conference formerly referred to as the World Administrative Radio Conference (WARC).

What I term the "technological" literature surrounding MSS generally refers to articles reflecting a predominantly technical bias. The most obvious examples are articles that deal specifically with the technical aspects of MSS systems. Comparetto (1993) and Sandrin and Haschart (1993) provide excellent examples of this technical bias. Both of these articles involve technical comparisons of various MSS systems. Bases for comparison include various factors such as minimum elevation angles, data transfer rates, access times, and orbital configurations. This is also the type of literature most often discussed in conference proceedings pertaining to mobile satellites. For instance, the *Proceedings of the Second International Mobile Satellite Conference* (1990) contain an entire session dealing with future mobile satellite communication concepts. All papers deal with technical issues. Presentations to other conferences, such as two made to the 1994 IEEE National Telesystems Conference (Hoffman, 1994), often deal with technical descriptions of specific MSS systems; in this case one for Teledesic and another for Odyssey.

Often times, this type of technological focus is found in less technical form in industry magazines and academic journals. Hess' (1993) overview of Inmarsat's exploration of LEO, MEO, and GEO options for their Project 21 is an excellent case in point. This article, while broadly exploring the different technical requirements of these options, avoids the finer technical details. Found in the trade journal *Satellite Communications*, this article shares much with other articles dealing with MSS contained in this journal. Technological issues are contextualized within a broader consideration of industry structure, and the activities of various players within the industry. Generally speaking, questions revolve around who is doing what with what technology.

More academic journals, such as *Intermedia* and *Space Communications*, often deal with the same issues, although they pay less attention to comparing the activities of individual players on an ongoing basis. Two editorials by Joseph Pelton (1992; 1994) are illustrative of this. Both deal with broader assessments of MSS technology as a whole (rather than focusing on the characteristics of individual systems), and what influence they will have on the wider sphere of satellite communications in general. While outlining some of the potential technical difficulties faced by MSS providers, these articles essentially serve to "celebrate" the technology, highlighting the positive effects MSS will have on the future of telecommunications. These journals, when focusing on individual systems, do so in a moderately technical fashion, while also emphasizing potential applications. Bertiger's (1991) description of Iridium is a case in point.

Another defining feature of much MSS literature is a focus on the prevailing regulatory issues surrounding implementation of this technology. Roseman (1993) provides perhaps the clearest example of this. She notes the tendencies of governments which may hinder implementation of MSS, and proceeds to articulate several issues which must be addressed if MSS is to be adopted quickly. She concludes: "The satellite services we are projecting on the world will require an entirely new way of thinking by governments, by the industries they regulate, and ultimately by the consumers." (Roseman, 1993: 173) Much of the regulatory literature deals with spectrum allocation issues, and as such there was a substantial amount written pertaining to WARC '92 and WRC '95. Poskett and McDougal (1990) argue strongly for favourable allocations to be made for MSS. This is not surprising, since both work as planners for Inmarsat. Many of the longer articles pertaining to MSS found in the trade journal *Satellite Communications* also deal with issue of spectrum allocation. For example,

Saunders (1995c) spells out the strategies of the U.S. delegation heading into the WRC-95. She notes that, as was the case in 1992, securing spectrum space for LEO systems is a priority for the Americans.

The potential benefits of MSS are also laid out in what I term the developmental literature of MSS. Articles falling into this category foreground the issue of who will likely benefit from the implementation of MSS. These are usually people in areas unserved or underserved by existing telecommunications services: those in rural areas and the developing world. The article by Bertiger (1991) cited earlier is an example. It should be remembered that the three target markets specified by Bertiger all applied to the developing world. David Wright (1994; 1995), Inmarsat's Manager, Regional Programmes, also highlights the potential role of MSS in the development of the Third World. While briefly mentioning Project 21, his articles focus primarily on existing Inmarsat services, and in turn highlight the potential for Project 21, and MSS in general.²³ Existing applications of Inmarsat systems referred to are use of voice and data services by journalists, relief and aid agencies, and UN peacekeeping missions.²⁴

The developmental potential of MSS is often tied into notions of a global information economy. MSS is seen by some as a way for developing countries to finally be able to participate in the global economy, through development of their telecommunications infrastructures. Manuta's comments cited earlier, regarding MSS as an "appropriate technology" for developing countries desiring telecommunications development, are somewhat indicative of this point.

²³ Inmarsat-M service can be considered the prototypical personal satellite telephone. Thus any application of Inmarsat-M may well be more efficiently carried out by Project 21.

²⁴ See Wright (1995: 107).

Dr. Edward Slack (1995: 21), Director of International Land Mobile Development for Comsat Mobile Communications, also echoes this belief. Referring to Africa:

On a continent where the communications infrastructure does not reach remote locations and where the number of phone lines is only one per every 100 to 250 people, mobile satellite communications can help service needs where terrestrial or cellular communications are not feasible or cost effective.

While the assumption of the necessity for telecommunications development is often implicit, the comments of Russell Daggatt (1995: 94), president of Teledesic Corp. are quite explicit:

Today the costs of bringing the modern communications to poor and remote areas is so high that many of the world's citizens cannot participate in the global community. Yet the benefits of the information revolution should be extended to all, including those who do not live near centers of commerce or industry, who do not have ready access to doctors, hospitals, schools or libraries and who are at risk of being shunted aside. Satellite communications systems have the potential to alter the industrial paradigm positively and dramatically – and with it the lives of millions.

It is statements such as these, and the wildly optimistic assessments of the power of technology, that make MSS ripe for critical analysis. The myth-making of the information age, and MSS's role within it, must be more deeply explored.

We have so far examined MSS at a strictly descriptive level. We have explored various MSS proposals individually, as well as examined the commonalties of global mobile satellite systems. MSS has been contextualized within the broader history of satellite telecommunications, particularly with respect to American satellite policy and its initial international policy instrument, Intelsat. The current status of MSS with respect to spectrum space has also been explored. The chapter concluded with an examination of literature that deals directly with MSS. This descriptive exercise was necessary to gain a better understanding of MSS as a technological system. From here we must proceed to

an elaboration of the theoretical framework which will underlie the substantive analysis of this thesis.

Chapter 2

Theorizing Global Satellite Telecommunications

Having described MSS in the previous chapter , we can now turn our attention to setting out the theoretical framework to be used in this thesis. As stated earlier, this study will use a new political economic methodology articulated by Vincent Mosco (1993; forthcoming). At the heart of this framework is the consideration of three primary social processes: commodification, spatialization and structuration. These three processes will provide the basic structure for this thesis. The implications of MSS will be categorized under these headings, and each of these processes will be considered in its own chapter. It is these chapters that will form the substantive body of this thesis.

Before we proceed with the description of the framework to be used, it is necessary to properly contextualize Mosco's typology, both with respect to traditional political economy and international communications theory in general. This contextualization will essentially take the form of a brief historical overview of international communications studies, beginning with the traditional liberal approaches of scholars such as Daniel Lerner and Wilbur Schramm. The focus of these theorists was often on the developmental applications of communication technology, and the ethnocentric "need" for non-Western societies to "modernize." The evolution of this school of thought will be traced to the more current work of liberal commentators such as Eli Noam and Joseph Pelton. Current manifestations of liberal theory often take an overtly functionalist approach, positing a need for communications "deregulation" to facilitate the introduction of new technologies. This position is usually grounded in traditional liberal assumptions of the necessity of communications technology for social and economic development. The insights of these scholars into the process of telecommunications development will provide the basis from which a

critical analysis of MSS will be developed. They will also provide a solid theoretical context into which much of the MSS literature discussed in the previous chapter can be considered.

From here we will proceed to an examination of traditional critiques of liberal international communications studies. The first of these to be explored will be dependency theory. The basic tenets of this theory will be briefly outlined, from where we will proceed to an inquiry of this theory's application in the realm of communications. Application has essentially taken the form of cultural or informational imperialism theses, and has manifested itself concretely in the Non-Aligned Movement's call for a New World Information and Communication Order (NWICO), and the work of the United Nations Educational, Scientific and Cultural Organization's (UNESCO) MacBride Commission. The focus is traditionally on redressing the informational imbalances between the First and Third World states, in the process creating space for national information systems. While these aims are certainly commendable, the shortcomings of dependency theory, for instance its excessive focus on inter-state relations, make it unsuitable as a primary framework for the analysis of global MSS. As such, this chapter will incorporate a brief critique of dependency theory, primarily from the perspective of global political economy.

We will then turn to a broad discussion of political economy and its general application to the study of international communications. As we shall see, traditional political economic critiques share much with dependency theory; again the focus is often on informational domination and dependence between states. Yet these critiques have recently been expanded to include the internal class relations of both core and peripheral states. While these insights address many of the difficulties with dependency theory, there are inherent problems

with traditional political economy which also make its application to the analysis of MSS somewhat problematic. For example, traditional political economy tends to objectify technology, treating it as a fully-formed technical artefact and viewing it through an instrumental lens. This is not meant to imply that the insights of traditional political economy will not be incorporated in this thesis – on the contrary, they will provide a substantial part of this analysis – but to note that some of its shortcomings must be addressed if we are to achieve a more thorough understanding of the implications of MSS. By utilizing Mosco's framework, we can incorporate many of these traditional insights, while simultaneously avoiding many of the theoretical difficulties.

Mosco's framework, contained in his forthcoming *The Political Economy of Communication: Rethinking and Renewal*, operates both as a map of the field for the political economy of communication and as a theoretical statement addressing some of its difficulties: it both incorporates many existing insights and suggests ways of expanding the field's focus. Central to Mosco's thesis is the consideration of communications in terms of dynamic social relations, hence an emphasis on social processes rather than static institutional arrangements. While these arrangements are in no way ignored, what is foregrounded are the processes that give rise to the formation and transformation of these arrangements. It is here where the strength of this framework lies, particularly with respect to the analysis of MSS. This framework allows us to view this technological system as a form of "congealed social relations." Rather than viewing MSS as simply an instrumental tool of global capital – which I also argue in favour of – we can view MSS as an embodiment of the very *need* of global capital to extend its informational control apparatus to all parts of the globe. While this new technological system has the potential to transform current institutional

relationships with respect to existing telecommunications structures, its true strength lies in its abilities to instantly²⁵ extend capitalist relations to all parts of the globe. While critical political economy seeks to challenge prevailing capitalist notions of the value and necessity of MSS, liberal approaches, as we shall see, seek to rationalize and facilitate its application.

The Dominant Paradigm of International Communications

International communications studies began in earnest in the 1950's, with the development communications work of American scholars such as Daniel Lerner, Wilbur Schramm and Ithiel de Sola Pool. These theorists attempted to draw direct links between a society's level of communications development and what they viewed as "modern" society. Their essential thesis was that modern, industrial society was defined by, among other factors, an advanced state of communications development.²⁶ According to Schramm (1967: 7):

... when we find a country where income, urbanization, literacy, industrialization, school attendance, and other social factors are relatively high, then we can be quite confident that the number of radio receivers, the circulation of newspapers, and the flow of information through the country will also be high.

This, in turn, implies a prerequisite for "modernization" of developing countries is the development of advanced communications systems. While these theorists

²⁵ Of course this "instant" will only occur once these systems are operational, and even then calls placed through MSS systems will not be instantaneous. What is meant is MSS, once operational, will extend the informational control capabilities essential to the efficient operation of capitalism to every spot on the planet "in one fell swoop."

²⁶ Their model of an advanced, industrial society was, of course, the United States. This mode of society was contrasted with "traditional" and "transitional" societies. This typology was articulated by Lerner (1960: 139) as being:

	<i>Literacy</i>	<i>Urbanization</i>	<i>Communication System</i>
Modern	Over 61%	Over 25%	Media
Transitional	21-60	10-25	Media-Oral
Traditional	Under 20	Under 10	Oral

were ostensibly referring to mass media, as is indicated by Schramm, the assumptions underlying their beliefs do hold significance for those studying telecommunications, for they are quite similar to later modernization theory, which does deal explicitly with telecommunications issues.

Early development and modernization theory is underscored by an implicit belief in the superiority of modern, industrial society. Indeed, it tends to be rooted in a myopic and uncritical American ethnocentricity, which placed post-W.W.II American society at the apex of human development. This attitude is clearly seen in comments by Lerner (1963: 348), comments which today seem almost comical:

The modernization process begins with new public communication — the diffusion of new ideas and new information which stimulate people to want to behave in different ways. It stimulates the peasant to want to be a freeholding farmer, the farmer's son to want to learn reading so that he can work in the town, the farmer's wife to want to stop bearing children, the farmer's daughter to want to wear a dress and do her hair. In this way new public communication leads directly to new articulation of private interests.

Social development is seen by modernization theorists through an evolutionary lens. American society, values, and production techniques were assumed to be universally desirable, and the model to which all were supposed to aspire. Utilization of mass media would inevitably create a demand for things modern, and a rejection of current lifestyles as backward, primitive, and unproductive. Thus we find a powerful role envisaged for communications in the transformation of "primitive" societies.²⁷

²⁷ This emphasis on the importance and power of media messages is fascinating here, considering how these were downplayed by liberal communications scholars within American society. Gitlin (1978: 205) has pointed out that, "Since the Second World War.... sociological study of the media has been dominated by the theme of the *relative powerlessness of the broadcasters*." (emphasis added)

What is lacking is a consideration of the social, political economic, and military power of the United States. As Hall (1989: 44) points out;

The dominant paradigm [i.e. liberal, pluralist communication theory] has ... operated as if it could proceed without a theory of power; without a conceptualization of the social and economic structures and relations of American capitalism — which has been its paradigm instance; without a theory of cultural formations; and with no understanding of cultural struggle and transformation.

American power can here be understood to have been exercised over the Third World, where these theories were put into practice at times through brutal social engineering programs (see Simpson, 1993; 1994). The failure of American development theorists to consider issues of power fit well with U.S. strategic interests at that time. Simpson (1994) outlines the links between post-W.W.II American communication research and the U.S. military and intelligence communities, due to the latter's desire for effective psychological warfare techniques. Many of the foremost development theorists, such as Schramm and Lerner, were directly involved in military research programs. This is not to suggest a conspiracy on behalf of these scholars, but to point out how deeply they were immersed in the prevailing social and political belief systems of Cold War-era America. While this ethnocentricity is fundamentally problematic, in further dissecting Lerner's above statement, we also get a glimpse into how these scholars begin to theorize the individual.

Social mobility is seen here as a personal responsibility, where one must shed old, traditional views in favour of newer, modern ones; a process which was to be facilitated by exposure to new information and media. This assumption is evidenced in Lerner's (1960: 332) reference to "psychic mobility", which according to him is "the mechanism by which *individual* men transform themselves in sufficient breadth and depth to make social change self-sustaining." (emphasis added) This prioritizing of the individual over the social is consistent

with behaviorist theory in general, and its use as a theoretical basis for communications studies has been forcefully critiqued. Hall (1989: 42), for instance, vehemently rejects the "simpleminded and reductive account that the dominant paradigm has so often offered of the complex relationships between thought, discourse, practice, and structure." Giddens (1989: 57) argues that behaviorist assumptions such as these are based "on a false interpretation of what human agency is." Since these critiques are directed at the dominant paradigm of communication studies – being liberal pluralist approaches in general – they can be effectively applied to traditional development and modernization theory as a branch of this school of thought. As we shall see, they can also be applied to much current liberal research into the implementation and use of telecommunications, work representative of the dominant paradigm reworked.

The Dominant Paradigm Reworked

The last two decades has seen a shift in development communications away from its singular focus on mass media towards a consideration of telecommunications technologies. Advanced telecommunications facilities are now touted by many liberal scholars as a natural and obvious prerequisite for modernization. Hornick (1984: 343), speaking in particular about rural development in the Third World, notes:

Optimists argue that rural telecommunications development will facilitate rural development broadly. Two-way communications will ease management and supply problems for networks of field workers, increase access to the levers of power for rural people, enable full integration of rural economies into national market systems, and accelerate distribution of useful information to rural audiences.

Another telling example of this sentiment is provided by Joseph Pelton (1984: 411). In an article entitled "INTELSAT and Initiatives for Third World Development", he bluntly asserts that "[e]conomic and communications development proceed hand in hand." As the title of Pelton's article suggests, satellite systems in particular have been thought to play a major role.²⁸ Lerner (1976) envisioned satellites as being able to assist developing countries by allowing them to "leapfrog" over what he saw as the traditional stages of Western development. It is not difficult to apply MSS to the process of "leapfrogging," particularly as it pertains to telecommunications development; in fact, it is the basic sales pitch.

The current emphasis on telecommunications development is partially rationalized by a consideration contained in Hornick's above statement: the integration of outlying regions into existing market systems. Riverson (1993: 1), for instance, in his assessment of the telecommunications needs of a developing Africa, accepts this belief as well: "One of the major prerequisites of economic integration in a modern and complex society is the development of a sound infrastructure in the telecommunications sector." Telecommunications technologies, due to their ability to transcend traditional geographical barriers, are touted as being able to "end the economic isolation of rural areas". Cleveland (1986: 23) has argued that we are witnessing a "passing of remoteness", proclaiming:

The passing of remoteness [as] one of the great unheralded macro trends of our extraordinary time. Once you can plug in through television to the U.N. votes or a bombing in Beirut or a Wimbledon final; once you can sit in Auckland, or Singapore, or Bahrain and play the New York stock markets in real time; once you can participate in rule, power and authority according to the

²⁸ It must be noted that the development potential foreseen for Intelsat was not simply due to its provision of telecommunications services. Intelsat also offered broadcasting services, and thus could be used by developing countries as an aspect of mass media policy.

relevance of your opinion rather than the mileage to the decision-making venue — then the power centres are wherever the brightest people are using the latest information in the most creative ways.

Hall's earlier criticism of the dominant communications paradigm clearly applies here. Though acknowledging the spatializing implications of telecommunications, there is no consideration of social power relations in Cleveland's comment. While stating that telecommunications will allow those in remote areas to play the stock market, something that admittedly will be *technically feasible*, he ignores the issue of who will actually have the knowledge, financial ability, or desire to engage in this activity. Modernization theory can thus also be characterized as being overtly technologically deterministic, through its overwhelming emphasis on technical capabilities as a prerequisite of societal development. This tendency, apparent in Lerner and Schramm's early reliance on the mass media as essential agents of change is also clearly illustrated in liberal claims of the benefits of the emerging "information society."

Visions of the "information society" can be traced to the belief that the primary organizing principle of Western society's means of production is now knowledge. We are witnessing a fundamental shift in society away from industrial-based to informational-based production systems. This phenomenon is not seen as being solely economic, but as essentially social. This social dimension was articulated by Daniel Bell in his notion of the "post-industrial society":

The concept of the post-industrial society deals primarily with changes *in the social structure*, the way in which the economy is being transformed and the occupational system reworked, and with the new relations between theory and empiricism, particularly science and technology. (Bell, 1973: 13 emphasis in original)

This "new" social order has also been variously referred to as third wave society (Toffler, 1981) and post-capitalist society (Drucker, 1993). Fundamental to these theses is the central role afforded information and communication technologies:

according to Dizard (1982: 2), the key characteristic of this age "is the increasing emphasis on the production, storage, and distribution of information as its major activity." These activities are fundamentally enabled by information and communications technologies. Often times, as in Toffler's work, and to an extent Dizard's, this transition is celebrated, or at the least considered a *fait accompli*.

These changes are often uncritically accepted as having positive and democratizing ramifications for the political and social organization of society. It is assumed the spread of information and communication technology will necessarily diffuse information more widely throughout society, with a resulting flattening of hierarchies and decentralization of power. Neuman (1991), for one, argues that new information media increase the abundance and diversity of information throughout society, and thus they hold the promise of creating greater political pluralism. This is also clearly the belief underlying Cleveland's notion of "the passing of remoteness." Technological determinism is here rationalized by an implicit belief in the democratizing nature of new communications technologies, and a resulting uncritical acceptance of the need for these technologies. Prioritizing the function and necessity of technology also has the theoretical consequence of focusing analysis on the hurdles facing the implementation of advanced telecommunications, and hence issues of regulatory facilitation are foregrounded.

Much liberal scholarship in international communication studies has been devoted to issues of telecommunications regulation. Regulation is the primary means by which states exercise sovereignty over their informational space. Yet Ithiel de Sola Pool (1990) has referred to modern telecommunications as "technology without boundaries", hence we see an implicit characterization of telecommunications as being fundamentally global in nature. This nature can be

closely allied with telecommunications' relationship to the existing (and deepening) global, liberal economic order; in essence an emerging "economy without boundaries." Thus we see a focus on the necessity of modifying state telecommunications policies to accommodate new developments in telecommunications, particularly through an emphasis on communications "deregulation"²⁹ and "liberalization." This focus too is grounded in a form of technological determinism, which posits regulatory change as a necessary prerequisite for realization of the full capabilities of any new telecommunications technology.

A belief in the perceived benefits of a more liberalized global economic system, parallel to beliefs in the benefits of the "information society", often underpins much of this work. Noam (1992), for example, argues that liberalization will lead to "normalization" in telecommunications network provision, meaning that telecommunications will more clearly resemble other parts of the economy, something which he is in favour of. With respect to MSS, the sentiments of Walda Roseman (1993: 170), former FCC Director of International Policy, also illustrate this:

... governments may not be up to meeting the challenge of opening markets and harmonizing regulation to make way for these services in time for their projected start dates. To do so, they must learn to think differently — internationally — and to recognize the implications that domestic regulatory regimes might have on global business, and hence, global service.

²⁹ Hudson (1993: 224) argues that the notion of "deregulation" only applies accurately to Canada and the United States:

In fact, virtually everywhere ...[else], the result of changing the telecommunications structure has been the need to introduce regulation where none existed. Under the PTT [Post, Telephone, and Telegraph] model, there is no separate regulatory function: decisions on frequency allocation, standards, and prices are typically made by the PTT or a related arm of the government

When an autonomous structure is established, there becomes a need for oversight.

The emphasis here is on providing a uniform international environment for the operation of MSS. By doing so, it is hoped a "level playing field" for MSS providers, and corporate users, will result. This aversion on behalf of many current, liberal American communications scholars to state regulation in the service of national interest is in many ways a new twist on traditional liberal beliefs of the developmental imperative of mass media and telecommunications. Rather than emphasize how these systems will serve to "advance" developing societies – an assumption that is almost implicit in current liberal rhetoric – the accent here is on facilitating its adoption according to principles most favourable to First World service providers and users.

Liberal, pluralistic approaches make up a large proportion of the theoretical literature dealing with international communications. Modernization and developmental theorists have long argued that mass media and telecommunications technologies are essential to the social, political, and economic development of Third World societies. Often, this approach was grounded in American ethnocentrism, using Western society as a model for emulation. More current literature, often finding justification in notions of an emerging "information age", assumes much the same general stance as earlier literature, often presupposing the need for advanced telecommunications and information technologies, while earlier theorists emphasized the mass media. This approach in general suffers from being technologically deterministic, placing the power of change in the hands of the technology. Also lacking is a theorization of issues of power. It was this absence, particularly a consideration of power at the national level, that has led liberal developmental theory to be critiqued by dependency approaches.

Dependency Analysis

Dependency theorists have long been concerned with the power imbalances that exist between First World and Third World nations. Dependency is seen as multifaceted, with economic relations a primary aspect. Dos Santos (1985 [1970]: 303) defines dependency as:

... a situation in which the economy of certain countries is conditioned by the development and expansion of another economy to which the former is subjected. The relation of interdependence of between two or more economies, and between those and world trade, assumes the form of dependence when some countries (the dominant ones) can expand and can be self-sustaining, while other countries (the dependent ones) can only do this as a reflection of that expansion, which can have either a positive or negative effect on their immediate development.

Sussman and Lent (1991: 11) have pointed out how "[d]ependency writers have witnessed ... the industrial capitalist countries' ('center' or 'metropolis') ... control of Third World ('periphery' or 'satellite') economic development options."

Dependency theory emerged as a critique of traditional realist international relations theory, which focused on issues of high politics such as diplomacy and the exercise of military power. Thus realists would see colonialism solely as a matter of formal political control, such as the British Raj in India. Dependency theorists reject these assumptions as being too narrow, and have conceptualized neo-colonialism, an arrangement in which Third World states become de-facto colonies of developed capitalist nations through economic subjugation. With respect to communications, dependency theorists have primarily focused on issues of cultural domination. This is consistent with a sustained critique of the early tenets of modernization theory, and its emphasis on the mass media.

Dependency theorists have argued that Western media content associated with developmental models of communication often leads to a form of neo-colonialism. While modernization theorists emphasized the educational uses of

mass media, lacking was a consideration of where the content was to come from. The reality of media industry structure worldwide has meant Western, primarily American, domination of international information flows. This reality is the essential basis for theses of cultural and informational imperialism. While the age of formal territorial colonialism has come to a close, newly independent nations in the Third World are now subject to a new form of imperialism: cultural domination. The cultural biases of Western society are imposed on Third World countries through media content. Referring to news coverage, Reyes Matta (1984: 64) states:

... the contents and attitudes of international information are determined in the international capitals of information: a news agenda, in which the majority of Third World countries do not feel represented, is imposed on the world from these cities. ... Indeed, instead of the recognition of cultural diversity the promotion of a transnational form of culture characterizes the mass media worldwide. Accordingly, Third World countries have pointed out emphatically that information should, above all, constitute a social benefit and not be treated as merchandise.

Articulation of the demands of Third World states with respect to redressing imbalances in international informational flows took place in the 1970s through UNESCO, under the rubric of demands for a New World Information and Communication Order. Masmoudi (1984) identified three essential spheres of information imbalances: the political sphere, the legal sphere, and the techno-financial sphere. Each of these spheres was itself characterized by a large subset of specific problem areas. The overriding concern here was to create a greater level of equity in information flow between First and Third World states.

Dependency theory has also found application in the areas of telecommunications and information. Smith (1980: 176), writing about the "geopolitics of information", concluded that, "... the threat to independence in the late twentieth century from the new electronics [i.e. telecommunications and

information technologies] could be greater than was colonialism itself."

Gonzalez-Manet (1992: 10) provides an excellent illustration of the application of dependency theory to the "informatization" of society. He asserts:

Currently a few countries and megacorporations are trying to maintain their ascendancy through control of the informatics industry. This means that technological progress — supposedly for the benefit of all humankind — takes on a conditional and discriminatory character, less a vehicle for social transformation and more a means to guarantee financial and political power.

These processes have a direct impact on the sovereignty, independence and cultural identity of the countries of Asia, Africa, and Latin America.

The fundamental concern here is consistent with the primary focus of dependency theory: the subjugation of developing *states* to the interests of the First World. It would not be difficult to effectively apply this analytical framework to the study of MSS. For instance, MSS renders development of an indigenous telecommunications system unnecessary, and the infrastructure itself remains in the hands of First World transnational corporations (TNCs). Hence dependency is characterized by the consequent reliance of Third World countries on TNCs for continual provision of their entire telecommunications infrastructure. Sussman and Lent's observation about control of development options is also useful; First World TNCs through their control of the infrastructure remain in control of options available for telecommunications development.

While Gonzalez-Manet does expand the conceptual framework of dependency theory somewhat to include the consideration of transnational corporate actors, his focus remains consistent with dependency theory's prioritization of the nation-state. Dependency approaches can in this instance be contrasted with potential neo-realist considerations of MSS. Neo-realism, itself a critique of realist international relations theory, posits economic influence as the

primary means of projecting state power, rather than traditional realist emphases on military and diplomatic power.³⁰ TNCs are viewed as national agents. For example, neo-realist theory would be used by a First World state, most likely the U.S.³¹, to justify MSS as an economic instrument furthering its national interest. Neo-realism does, in fact, underlie much current liberal communications work. Dizard (1989:184) provides an excellent illustration, "The United States needs a strong world communications network to support its overseas interests. Economically, the export of communications goods and services is increasingly important." Key to the understanding of neo-realist thought are issues of *national competitiveness*, which focus on how a state's industries and corporations provide it with the economic clout to influence the actions of other states.

Neo-realism contrasts well with dependency theory, for the latter's focus is on how the *national economies* of developing states are dominated by those of First World states. The corporate providers of telecommunications and information technologies in this context provide a lever of control for the United States to use over Third World states. However, the weakness in the neo-realist approach comes from its reliance on the national character of what are essentially transnational corporate actors. To assume that firms such as Motorola or TRW will always act in the best strategic interests of the United States may

³⁰ However, one must be careful not to equate neo-realism, as it is defined here, with mercantilism, which according to Gilpin (1988 [1975], p.245), prioritizes "*national* economic and political objectives over considerations of *global* economic efficiency." (emphasis in original) Neo-realism, on the other hand, incorporates liberal considerations of an interdependent world economy, and thus conditions or actions needed to create or maintain a stable and preferably favourable world economic system are taken in to consideration.

³¹ The U.S. is the obvious example, considering that all current MSS proposals, with the exception of ICO, originate with American-based transnational corporations.

prove to be somewhat presumptuous.³² This weakness also highlights the shortcomings of dependency theory. It, too, suffers from an overreliance on the national character of capital, and hence national control of information and communications technologies. Gonzalez-Manet (1992: 7), decrying developing countries' lack of modern communications infrastructures, points out, "... they don't possess their own satellites — except for India, Indonesia, Mexico and Brazil, and the Middle Eastern Arab community." Presumably, Gonzalez-Manet is speaking favorably of these nations' possession of domestic satellite capability, despite the fact that each state relied heavily on First World technology, expertise and launch capability, and that these systems are sometimes in the hands of brutal and authoritarian regimes.³³

Traditional Political Economy of Communication

Traditional political economy approaches to communications studies share many of the same concerns as dependency theory. In fact, it is somewhat difficult to draw a definite distinction between the two. An important early work in this field, Herbert Schiller's (1992) *Mass Communications and American Empire*, highlights this difficulty. Originally published in 1968, Schiller outlines American activities in both the domestic and international spheres of mass communications, using this as the basis for his assertion that these activities are part of a desire by the U.S. to control and dominate international information

³² However an argument could be made that such a correspondence of interests does indeed exist. After all, both of these firms are major military contractors, and MSS systems in particular owe much to defense research. This certainly is an avenue in need of further exploration.

³³ The Indonesian government rationalizes its Palapa satellite system by highlighting the desire for effective communications throughout its dispersed island archipelago. Presumably this also includes East Timor, annexed by Indonesia in 1975, where the Indonesian military, closely allied with the Suharto government, has been accused of genocidal policies and multiple atrocities against the indigenous Timorese.

flows. This domination is motivated by the desire to maximize American strategic and commercial interests. While Schiller's argument keys on the international dimensions of American media power, he starts from a consideration of domestic American communications structures, and their impact on social development. He argues (1991: 73):

Communications, which could be a vigorous mechanism of social change, have become instead, a major obstacle to national reconstruction. They have been seized by the commanding interests in the market economy, to promote narrow national and international objectives while simultaneously making alternate paths seem either undesirable or presenting their existence from becoming known.

Smythe (1981: 1) also draws a direct link between mass communications and the control of social development:

The mass media of communications (television, radio, press, magazines, cinema and books), the related arts (e.g. popular music, comic books), and consumer goods and services (clothing, cosmetics, fast food, etc.) set the daily agenda for the populations of advanced capitalist countries and increasingly for Third World nations. It follows, therefore, that the policy which governs what appears on the daily agenda produced by these institutions has a special role in defining the process of "development" for these populations.

Implicit in this comment is an effective concern for the process of *national* development, whether First World or Third World.³⁴ The First World perspective of these writers is perhaps key, and may be used to draw out a distinction between dependency and political economy approaches. Political economy begins with a consideration of the internal class dynamics of capitalist states, whereas dependency theory prioritizes international relations. This conclusion is borne out by the observations of Sussman and Lent (1991: 18), "...dependency analysis has ... been criticized, especially by Marxian scholars, for

³⁴ In Smythe's case, this particular work was concerned with Canada.

failing to focus on the *internal* class dynamics of economic underdevelopment and peripheral plutocracies." (emphasis in original) Thus political economy can be said to have extended dependency analysis to include domestic class relations.

An emphasis on class relations can be found in the work of Armand Mattelart. Greatly concerned with the international dimensions of media power, Mattelart nonetheless begins his analysis of communications with a consideration of social class divisions, and their corresponding impact upon the mode of production of communication. He states (1979: 36):

The manner in which the communication apparatus functions, which determines the elaboration and exchange of messages, corresponds to the general mechanisms of production and exchange conditioning all human activity in capitalist society.

Mattelart goes on to interrogate the liberal rationales underlying media use in capitalist societies, drawing attention to what he believes to be the central role of mass media within capitalist society, that of reproducing capitalist class relations:

ideas and social practices dealing with freedom of the press and expression, and with the professional ethics of the communicator, constitute the specific ideological forms which, within the sphere of communication and news, confine the communication process within a given framework and legitimize its function of reproducing all of the social relations within the capitalist mode of production. (1979: 36)

The scholarship of Mattelart, Schiller and Smythe is rooted in general Marxist assumptions about the nature of society, which is seen as class divided. Issues of class power are foregrounded, and communication media are primarily seen as conduits for the transmission of messages incorporating the class biases of the producers, generally taken to be capitalists themselves. Capitalist ideology is thus seen as a fundamental component of media messages.³⁵ The media is seen

³⁵ For an overview of Marxist approaches to the understanding of ideology, see Barrett (1991). For a discussion of various conceptions of ideology, and their application to the study of communications, see Allor (1987).

as a primary instrument of capitalist hegemony.³⁶

A concern with ideology is an important feature of much political economy of communication. This concern has often manifested itself in attempts to identify the ideological components of commercial media activities. Gitlin (1979: 511), referring to television content, argues that:

... hegemonic ideology is systematically preferred by certain features of TV programs, and that at the same time alternative and oppositional values are brought into the cultural system, and domesticated into hegemonic forms at times, by the routine workings of the market.

These features include format and formula, genre, setting and character type, slant, and solution. Browne (1984: 598) relates the scheduling and flow of commercial television in its entirety, what he refers to as its supertext and megatext, to the legitimization of capitalist work relations:

The schedule, as it disposes and organizes the "supertext," is, let us say, the chief institutional mediation between the worlds of work and entertainment. Modeling "television," then, along the lines of the political economy of the television *megatext* consists of elaborating a framework that links the statements of social and psychical value specific to programs in diverse time slots, and of particular audiences, to the process of the general economy.

Herman and Chomsky (1988: 2) point to propagandizing role of the mass media in capitalist society, articulating a propaganda model consisting of five filters:

- 1) the size, concentrated ownership, owner wealth, and profit orientation of the dominant mass-media firms;
- 2) advertising as the primary income source of the mass media;
- 3) the reliance of the media on information provided by the government, business, and "experts" funded and approved by these primary sources and agents of power;
- 4) "flak" as a means of disciplining the media; and
- 5) "anticommunism" as a national religion and control mechanism.

³⁶ Grounded in the work of Antonio Gramsci, hegemony refers to accepted systems of social belief—the "common sense" of a particular society at a given historical epoch. With this concept, Gramsci was attempting to explain why sub-altern classes seemed to accept and support capitalist social relations, instead of articulating a definite class consciousness. Ideology is seen as the means by which hegemonies are constructed.

Focusing on the mass media and its associated forms and content allows these scholars to deal with the dissemination and diffusion of ideas throughout society. While not dealing specifically with telecommunications, the structural analyses employed here can be applied somewhat to telecommunications. Issues of power, organizational control, utilization, and the values inherent in media (in this case, network) forms all bear on the questions of telecommunications development, implementation and utilization in modern, capitalist society.

Recently, a vigorous body of political economic literature has begun to deal directly with issues of telecommunications and information technologies. Much of this literature challenges widely held liberal assumptions of the "information age." Mahoney (1992: 19) writes that, "Information and technology are not neutral. The information age is not beyond capitalism. Rather, the information age is characterized by the intensifying politicization and privatization of information." This reference seems to directly challenge the notions of Peter Drucker (1993), and his vision of "post-capitalist society." Dan Schiller (1988) argues that information-age boosters base their beliefs on skewed assumptions of why information is important. Robins and Webster (1987: 113) offer a forceful critique of Daniel Bell's "post-industrial society", arguing that the decentralizing applications of information technologies, as foreseen by Bell, essentially represent "bourgeois individualism, consumerism, privatization and isolation — ...[and are] no more than a mode of capitalist domination/command. ...[T]he information revolution will merely reinforce and solidify existing social inequalities... ." These critiques attempt to dispel the notion that the "information age" will be a technological utopia in which all members of society will have high-paying jobs, we will "telecommute" to work, and have full access to an

almost unlimited supply of electronic information. The "information age" is seen as the next stage in the historical development of capitalism.

Some scholars have attempted to specifically address issues pertaining to the development and implementation of telecommunication and information technologies. Dan Schiller (1982) has written about the relationship between government, seen essentially as a captive agent of corporate capital, and telematics. Davies (1994) argues that the telecommunication network model preferred by a given state is often dependent upon socially and politically accepted organizational forms. For example, he notes that while monopoly structures were acceptable in both Western Europe and the United States during the early part of the twentieth century for delivery of infrastructural services, the U.S. opted for private control of the infrastructure subject to government regulation while Western Europe chose the state-run model, contrasting both with the decentralized model utilized in Finland. Thus Davies argues against the notion of telecommunications as a "natural" monopoly, citing preexisting social and political factors as influences on the decisions made. Mansell (1993) attempts to explain the evolution of the "intelligent network", a term basically referring to digital telecommunication networks and the ancillary services made available by them, by focusing on the strategic aims of the corporate service providers, rather than on the idealist justifications of technological potentialities.

It is my contention that critical political economy offers the best theoretical approach from which to analyze MSS. Its foregrounding of issues of social, political, and economic power allow one to most effectively answer the question many in our society often dismiss as precocious: why? Why is MSS so important? Why is it needed? Why are billions of dollars being spent on these systems? These are some of the fundamental questions that arise for a critical

contemplation of this undertaking. Thus having made a case for the merits of a political economic analysis of MSS, we must now turn to the question of what form of political economy would be the most appropriate. Mosco (1993) distinguishes between three traditional critical approaches to the study of the political economy of communication, broadly termed North American, European and Third World perspectives. Generally speaking, these three approaches can be said to focus on structures and institutions, class dynamics, and the global division of labour respectively. All of these approaches could most certainly be applied effectively to the analysis of MSS. For example, the North American viewpoint would focus on the role of transnational corporate agents involved in the implementation and utilization of MSS, while the Third World approach would concentrate on how MSS would work to shape, and likely deepen, inequalities in the global division of labour. While all worthwhile, none of these approaches on their own adequately explore the comprehensive implications a technology such as MSS will have on global society. What is needed is a broader framework that subsumes the foci of these approaches, and is fundamentally grounded in a broad and dynamic social totality.

The Political Economy of Communications Recast

It is my belief that the recent work of Vincent Mosco (1993; forthcoming) provides an excellent framework through which the implications of MSS can best be understood in their broadest sense. His use of the three *processes* of commodification, spatialization, and structuration as entry points acknowledges the dynamic nature of society as a whole, while maintaining a sufficiently broad focus to include the concerns of the three traditional schools of political economic

thought. Roughly speaking, commodification can be said to include many of the concerns of the North American approach, spatialization, the Third World school, and structuration, the European viewpoint.³⁷ Mosco's framework also addresses some of the shortcomings apparent in traditional political economic analysis. For instance, while North American political economy of communications has provided us with a powerful critique of the foundations of capitalist media, it tends to view structures and institutions, such as corporate media providers and government, as static, rigid and fully formed entities. This leaves little theoretical room for notions of alternative media or human agency. Traditional political economy also tends towards objectifying technology.³⁸ Communication media are seen as instruments of capital. While this proposition seems valid enough on the surface, it tends to obscure potential oppositional uses of the media, conflicting interests within capital that may preclude the use of more effective technologies, and alternative, and more democratic, network configurations.

The first of these three processes, commodification, essentially refers to a shift in social valuation away from use value to exchange value. Through this process, goods and services are reduced to quantitative considerations, with a consequent role created for scaleable and transferable medium of exchange (i.e. capital). What we see is the progressive application of the market as the fundamental arbiter of society. Considerations of social utility are marginalized,

³⁷ By no means am I intending to imply a rigid correspondence between the three traditional schools of political economic analysis and the three processes proposed by Mosco. While there is certainly overlap between these approaches and Mosco's processes, I am merely suggesting a way of viewing these processes as encompassing some of the concerns dealt with by these three modes of analyses

³⁸ These criticisms do not broadly apply to all previous political economic analyses of communications. The field is far too broad and dynamic to paint it in a single stroke. Rather, I am simply attempting to draw out some of the potential weaknesses that need to be addressed if we are to have as comprehensive an analysis of MSS as possible

if not excluded. The analysis of MSS through the process of commodification will begin by situating MSS within the historical context of global satellite telecommunications. Recent technological developments in satellite telecommunications, including MSS, have created a shift in focus from strategic issues to economic ones. The interests of those wishing to take advantage of these advanced telecommunications services must also be considered. This shift represents a reconsideration of telecommunications and information as private commodities, rather than public goods. Further evidence of the deepening commodification of telecommunications can also be seen through the recent articulation of telecommunications in terms of trade in services.

Spatialization refers to the tendency and power of capital to reshape conceptions and relations of space and time. This usage can be seen as a critical interrogation of the phenomenon of the "global village." As Mosco (1993: 23-4) notes, "Spatialization encompasses the much-abused term globalization which perhaps best refers to the worldwide restructuring of industries and firms." The changing spatial relationships engendered by MSS have several dimensions that will be explored. Most obvious is MSS's technical ability to offer globally ubiquitous service. The efficient operation of firms at the global level necessitates an increasing reliance on telecommunications to provide the informational control channels essential to effective bureaucratic organization. The spatial dimension of MSS also encompasses the strategic alliances needed to make MSS workable. Competition between MSS providers may serve to redraw the global map in terms of corporate spheres of influence, while the specific features of strategic partnerships may serve to establish or reinforce a global hierarchy among telecommunications firms. This in turn will have ramifications for state

restructuring. The spatial redefinition of the globe in terms of corporate spheres of influence also represents a potential consequence.

MSS also has implications for the process of structuration, yet in many ways this perhaps is the most difficult to apply. Structuration, a theory first articulated by Anthony Giddens, essentially expands on Marx's concept that humans create history, albeit not within a condition of our own making: we are free to act, but our action is bounded by the structures of society. Mosco's application of this theory can be seen as an explicit attempt to prioritize the role of human agency within the political economy of communication. Mosco (1993: 27-8) notes that structuration:

... helps to balance a tendency in political economic analysis to concentrate on structures, typically business and governmental institutions, by incorporating the ideas of agency, social process, and social practice. Concretely, this means broadening the conception of class from its structural or categorical sense, which defines it in terms of what some have and others do not, to incorporate a relational and a constitutional sense of the term.

While Mosco is here primarily concerned with the agency of sub-altern classes, with respect to MSS it may be more helpful to examine structuration in terms of its role in relation to dominant classes. The overtly liberal rhetoric surrounding MSS debate, as well as the general justifications provided by liberal communications scholars, can be seen as an attempt to exert a hegemonic influence, framing the debate in terms favourable to global business. Much of their work is predicated on how best to provide efficient and advanced services to the consumer. By focusing on the consumer, questions of a broader social nature are pushed to the side. This focus, particularly within policy circles, can be said to have assumed the status of common sense.

By focusing on social processes, rather than on institutions and structures, social change is implicitly understood as being ubiquitous. Mosco conceptually acknowledges the dynamic nature of society, and in turn moves away from static notions of social institutions. Development and use of technology can be more fully seen as conditioned by an ever-changing society, making strictly instrumental views insufficient. For example, if FM radio can be considered a far more effective corporate instrument than AM radio, due to its higher fidelity, than how does political economy deal with the corporate suppression of FM? By focusing on social processes, Mosco's framework foregrounds the social relations that give rise to a particular technological configuration, as well as the social relations that create space for the accommodation, and contestation of a technology within a broadly conceived social totality. This allows us to view technology not as fully formed, physical artefacts, but as a historically contingent set of congealed social relations.

Perhaps the greatest strength of Mosco's framework is its utility as an analytical tool. This framework provides an effective map for the coherent incorporation of the insights of many critical scholars. While this chapter has attempted to make a strong case for the specific utilization of Mosco's political economic framework, it has done this by making a broad case for the political economy of communications. A theoretical perspective such as this provides the means through which important critical questions about the implications of technological advancement can be formulated. The three processes proposed by Mosco allow for the conceptual ordering of an effective investigation, while simultaneously reminding one to think about the dynamic processes of social life. This thesis is partly intended as a demonstration of this theoretical

methodology, and from here we shall proceed to the analysis of MSS with respect to the first of these processes, commodification.

Chapter 3

MSS and Commodification

The first entry process proposed by Mosco is that of commodification. Two general dimensions of the process of commodification as it applies to communication are given, and these in turn will provide the general framework for this chapter. The first dimension refers specifically to the commodification of communication processes. In order to apply this insight to MSS, we will begin with a discussion of the commodification of telecommunications in general. The recent articulation of telecommunications in terms of a tradable service and the advent of private telecommunications networks are but two examples of this phenomenon. This change also gives rise to growing consideration of information as a commodity. Mosco (forthcoming) also refers to the creation of the "cybernetic commodity": the use of communication monitoring systems to create a salable commodity in collected information. MSS, through its use as a remote monitoring technology, allows for the creation, movement, and hence marketing, of cybernetic commodities. Extensive commodification is also taking place within communication processes in general through movements towards metered service, with MSS providing a workable case-study. The second general dimension of commodification in the political economy of communication reflects a belief in communication's facilitatory role in commodification processes in the wider political economy. For instance, MSS may also serve as a factor in the further commodification of public space and the state. Before we turn to a deeper exploration of MSS and commodification, it is necessary to clearly determine what is meant by commodification.

Commodification Defined

Mosco's typology begins with the consideration of the process of commodification. For him:

Commodification refers to the process of turning use values into exchange values, of transforming products [and presumably services] whose value is determined by their ability to meet individual and social needs into products [and services] whose value is set by what they can bring in the marketplace.
(forthcoming: Chap.4-p.8)

This prioritization stems from a long-standing concern with the commodity form in Marxian analysis. According to Mosco (forthcoming: Chap.4-p.3), "One of the keys to Marxian analysis and a legacy that has influenced all subsequent political economy is to interrogate the commodity to determine what the appearance means, to uncover the social relations congealed in the commodity form."

Commodification is seen as the fundamental dynamic process of capitalism, the process by which "the market" is extended into areas previously free of capitalist relations. As Melody (1993: 73) reminds us, "The general definition of a market is the provision of exchange opportunities between buyers and sellers. ... An exchange can only take place if there is a commodity, or service, to be traded. Trade requires ownership, that is, enforceable property rights in the commodity [or service] being traded." Thus we see a key dimension of the commodity form: its social status as private property.

Critical political economy argues the commodity form is inherently exploitative, and seeks to expose the underlying power relations in capitalism that give rise to commodity production. According to Mosco (forthcoming: Chap.4-p.6):

... the expansion of capitalist control eliminates alternative systems of production and forces labor into a social relationship wherein it takes on the status of commodity, or a factor of production, along with land and raw materials, and is made to give up its control

over the means of production. As a result workers are made to exchange their labor power for a wage that does not compensate fully for the labor sold.

Capitalism is based upon the appropriation of this surplus value, and a question thus arises as to how this surplus is calculated; the issue of valuation thus becomes of primary importance. Classical economists argue that the objective and neutral law of supply and demand, and its manifestation in the free market, is where exchange values are decided. Marxian analysts, on the other hand, assert that exchange values are conditioned by the social relations of production, and hence are not neutral but reflective of the power distribution within society.

When considering the relationship between commodification and communication processes within society, Mosco (forthcoming: Chap.4-pp.4-5) highlights two general dimensions:

First, communication processes and technologies contribute to the general process of commodification in the economy as a whole.... Secondly, commodification processes at work in the society as a whole penetrate communication processes and institutions, so that improvements and contradictions in the societal commodification process influence communication as a social practice.

The first of these dimensions refers, among other things, to the utilization of communications by capitalist corporations to make their operations more efficient. Communications and computer technologies, together dubbed information technologies, allow for a greater level of knowledge of production and distribution channels, giving corporations a greater level of control over their operations. The second dimension, dealing specifically with communication processes and institutions, in many ways highlights the contestable status of communications within society. The "penetration" of commodification into the realm of communications presupposes a consideration of communications as a public good, rather than a private commodity. The commodification of communication processes and institutions revalues them, investing them with

the congealed power relations of the commodity form. The negative implications of this for democratic civil society and public space are what make the investigation of the commodification of communications so crucial.

The Commodification of Telecommunications

In order to more fully explore the implications of the commodification of communications and how they pertain to global mobile satellite systems, it is first helpful to consider the commodification of telecommunications in general. This will provide us with an historical context in which to situate MSS. This new technological system must be viewed historically, and not in isolation from existing telecommunications for several reasons. First, MSS is in no way intended to replace existing terrestrial telecommunications services. On the contrary, it is being proposed as a complimentary service, intended to provide coverage to areas not already being served by terrestrial wired or wireless telephony. As well, the provision of MSS by the private sector is made possible only by the recent articulation of telecommunications as a tradable service, that is, by the commodification of telecommunications. Situating MSS historically is consistent with the consideration of commodification as a *process*. It not only enables us to view MSS as being facilitated by previous steps towards commodification, but allows us to view it as a potential agent of further telecommunications commodification. As we shall see, the implications of MSS do hold such potential.

It is difficult, if not impossible, to propose a specific point in time where the commodification of telecommunications began.³⁹ However, for our

³⁹ One might argue that the original patents for the telephone granted to Alexander Graham Bell in 1876 constitute the beginning of the commodification of telecommunications. Patent rights are certainly consistent with Melody's earlier definition of a marketable commodity as having enforceable property

purposes, it is more important to consider telecommunications through its recent articulation in terms of a tradable service. There are many ways in which to view this, yet we can generally group these under the headings of privatization and liberalization. In terms of liberalization, the recent reconceptualization of telecommunications as a marketable service points to the deepening commodification of communications. This shift has been spearheaded primarily by the efforts of the United States, acting in concert with American-based telecommunications companies. The desire has been to open up foreign markets for American firms, commercial interest being the driving force. This has had important implications for the treatment of telecommunications at the international level:

The search for access to foreign telecommunications markets and, if entry is achieved, for rules to be able to compete on reasonable and nondiscriminatory terms, have led telecommunications companies to examine the possibilities offered by applying trade policy tools to telecommunications services. The result is that what had previously been a regulatory area, reserved almost exclusively to telecommunications ministries at home and the International Telecommunications Union (ITU) internationally, is increasingly becoming a market access issue addressed domestically by trade ministries and internationally by the negotiations for a General Agreement on Trade in Services (GATS) under the auspices of the General Agreement on Tariffs and Trade (GATT).
(Broadman and Balassa: 1993, 32-3)

In order to clearly illustrate the commodification process, we must consider what features of telecommunications initially made it a "regulatory area."

Broadman and Balassa (1993) point to two features of telecommunications that lead to initial governmental oversight. First, telecommunications was considered a "natural monopoly", with competition thus representing a socially wasteful use of resources and, second, governments saw regulation of

rights. Thus telecommunications can be said to have always existed in some degree of commodified form. However, my point here is to illustrate the contestable nature of telecommunications services – are they a public good or private commodity? – and to situate this question within the current wave of telecommunications liberalization of the past twenty years.

monopolistic suppliers as the best way to achieve "universal service." These justifications were historically presented as technical necessities, and thus offer themselves to easy circumvention by pointing to more "modern" technologies. New technologies are seen as being able to more easily facilitate competition and regulation is no longer seen as the most effective way to deliver services. What we are left with are the assumed benefits of a supposed "free market" and an unyielding faith in the power and potential of technology. The pursuit of market share by private transnational telecommunications firms, however, is not equated by these authors with the exercise of political economic power. This is also suggested by Mahoney. Speaking directly about American strategy regarding international communications fora, she argues (1993: 334) that:

The basic goal has been to extend the authority of business interests (not an abstract, neutral "market") to the entire range of communications decision making, nationally and internationally. Political opposition to such efforts in the 1970's led to a moment in which international organizations became potentially influential fora of debate and policy formation. Yet, the power of business interests, greatly assisted by the U.S. government responded by shifting the terms and the terrain upon which decisions in communication would be taken.

This extension of business interests is only made possible through the commodification of telecommunications, and the concurrent emphasis on telecommunications markets.

With respect to MSS, these trends are exceptionally apparent. International fora that dealt with allocation of spectrum for MSS came under the same sets of influences from American business. Initial allocations were made at WARC '92, and all MSS systems received their desired allocations. According to Jan W. Baran, the American ambassador to the WARC '92, "... the conference was a major success for the U.S." (cf. Manuta, 1992: 26) The American delegation amply reflected the interests of the private sector. According to Manuta (1992:

27), "Some fifty-two representatives, made up of government personnel and members of the private sector, were named to the U.S. delegation. In addition, another 25 or 30 U.S. representatives of the different interested companies attended the WARC as 'special advisors.'" The growing influence of the private sector, in this case at WARC '92, was noted by Mohan (1992: 6):

... policies of liberalisation in the developed countries have seen the emergence of new players. A number of private companies, planning to offer services globally have been aggressively pursuing an active role in spectrum decision-making and their growing and visible influence on the ITU decision-making system is becoming more apparent.

The direct extension of private sector interests into WARC '92 can be seen as complementary to the U.S.'s utilization of GATT as a forum for discussion of telecommunications. As we have seen, American telecommunications policy with respect to both GATT and WARC '92 was partly driven by the interests of its telecommunications suppliers, with GATT providing the economic rationalization and WARC providing the technical facilitation for new global services. The commodification process is here represented by the extension, both direct and indirect, of the interests of private telecommunications suppliers into these international fora, and the associated assumption of private sector considerations for telecommunications.

The interests of telecommunications suppliers are not the only ones driving the process of commodification. Large corporate users of telecommunications are also fundamentally involved in demands for market-based telecommunications services. Often, these corporate entities are active transnationally, and thus seek a uniform global telecommunications environment. In many cases, particularly with respect to the Third World, efficient utilization of telecommunications as a part of a corporation's global

information system is stymied by a lack of compatible facilities⁴⁰ or inhibiting regulation. Dan Schiller (1985: 108) also points to the simple bottom-line economic reasoning behind these demands:

Transnational business users are demanding "international systems solutions" which will allow them to integrate previously disparate voice, data and video systems into encompassing digital networks. In an immediate sense, their demand springs from a growing competitive need to reduce costs – in this case telecommunications costs. ... Across all sectors, transnational companies with dozens of locations and a characteristic reliance upon multiple networks for different communications functions, are keen to reduce soaring telecommunications costs by implementing the new systems.

Many of these concerns were specifically addressed by the GATS

Telecommunications Annex. According to Broadman and Balassa (1993: 33-4), this agreement:

... represents the first effort to develop multilaterally international trade rules for telecommunications services *to meet the needs of the overall business community*. The GATS Telecommunications Annex embodies the following elements. It:

- 1) stipulates that signatory countries are to provide reasonable and nondiscriminatory access and use of basic telecommunications services;
- 2) requires that regulations relating to use of a country's telecommunications network be made publicly available;
- 3) calls for cost-oriented pricing; and
- 4) specifies that users can attach equipment of their own choice to the network, use proprietary protocols, and interconnect to the public-switched network or private networks of their choice. (emphasis added)

As the authors note, the primary beneficiaries of these provisions are the transnational business community. The application of "cost-oriented" pricing⁴¹ and the implicit acceptance of private networks are meant to provide corporate

⁴⁰ This may be a result of network-wide proprietary protocols, which was often the case with respect to West European PTTs, or antiquated equipment, as is the case with many Third World countries.

⁴¹ This euphemism refers to application of supply and demand market economics to telecommunications provision, and is forwarded in opposition to the notion of cross-subsidization, whereby long-distance tolls are used to keep local rates "artificially" low. Thus, those most dependent on long distance telecommunications, namely corporate users, argue that they are made to subsidize local service, primarily used by individuals.

telecommunications users with the flexibility and market power to demand what amounts to preferred treatment from telecommunications suppliers.

The role of private networks, particularly with respect to their treatment under the principles of the GATS Telecommunications Annex, is key to the analysis of MSS and its implications for the commodification of telecommunications. These systems, with the partial exception of ICO, represent fully private, global networks. As we saw earlier, Roseman (1993) argued the necessity of regulatory changes to facilitate private international satellite systems, and that states must globalize their regulatory vision. Yet this argument is now somewhat superfluous; these questions, as Broadman and Balassa point out, are no longer *regulatory* but *trade* issues. Interconnection between these systems and domestic public-switched telecommunications systems is mandated through the GATS Telecommunication Annex. Signatory states must provide public network access and interconnection not only to users of MSS, but similarly to MSS *suppliers*. Iridium and others may well be able to use this agreement as a means of guaranteeing regulatory accommodation, and hence access to national markets despite any reticence on behalf of national governments. Thus commodification of telecommunications, through the redefinition of telecommunications as a market-based service, directly allows for the potential of global mobile satellite services. MSS in turn further contributes towards the process of commodification in the wider political economy (as we shall later see), as well as satellite telecommunications specifically.

The private nature of MSS can, in this sense, be viewed alongside general trends towards privatization in telecommunications. Current satellite telecommunications has not escaped this trend. While eschewing outright privatization through a sell-off of assets, Intelsat's Director General, Irving

Goldstein, has called for a greater corporate orientation for the organization. Goldstein (1995*) argues, "A new decision-making structure must be adopted which allows decisions to be based principally on a commercial basis, not on difficult to achieve compromises aimed at accommodating the conflicting interests of individual members." Goldstein, however, fails to acknowledge that this commercial orientation itself represents primarily the interests of developed states and their corporate users. He further states, "Limitations inherent in the present INTELSAT decision-making process and policies may only be diminished by a structural change to a truly commercial business entity, a corporate INTELSAT." Despite the spin-off of ICO, Inmarsat has also encountered similar pressures, and its management has proposed similar changes to those outlined by Goldstein (Frieden, 1994).⁴² One of the primary factors behind the corporatization, and hence commodification, of these organizations is the perceived threat of competition and the desire to maintain market share. We can only speculate that MSS, as a technology capable of directly bypassing these organizations' core activities, is an influence in the commodification of Intelsat and Inmarsat.

These changes to Intelsat and Inmarsat, and the call for greater levels of private satellite telecommunications, are often rationalized through a form of technological determinism. It can be consequently argued that the process of commodification is itself driven to a degree by this type of reasoning. Frieden (1992), for instance, defines five types of private international satellite systems, each representing a model by which private systems attempt to justify their

⁴² The privatization of ICO is still not enough for some MSS competitors. According to Saunders (1995: 35), in December of 1994, "TRW filed an emergency petition with the FCC requesting that the [Federal Communications] Commission enjoin Comsat from Inmarsat-P participation." Inmarsat-P competitors apparently view Inmarsat's direct financial participation in the project as giving it an unfair advantage due to their international treaty status. Motorola has also made similar complaints (see Schneiderman, 1994: 67-8; Saunders, 1995b).

existence. One of these, the *Innovator* model, applies directly to MSS. According to Frieden (1992: 362), "The Innovator seeks to provide new services to untapped markets, or to better service underserved areas. Accordingly it will emphasize the ability to generate new traffic rather than divert traffic from existing carriers." There are two related assumptions at play here. First, Frieden is perhaps utilizing the word *innovator* to denote a satellite systems' intention to create new markets. As noted, the emphasis is on a lack of overlap between markets for private and public satellite telecommunications providers, a division that may or may not exist in reality. Second, implicit in this model is the Innovator's reliance on new technological configurations to service these new markets. The technological desirability and resulting benefits of *innovative* systems are taken as a given, assuming an almost dogmatic belief in the merits of new technology. These two assumptions are fundamentally interrelated, for it is only through the utilization of private satellite telecommunications, and a reliance on the new technologies utilized by these systems, that these anticipated new markets can be served. Technologically deterministic assumptions such as these, tied to consumer service rhetoric, serve to drive an agenda foregrounding private telecommunications networks at the expense of public satellite telecommunications.

Movements towards commercial orientation on behalf of ostensibly public telecommunications institutions are often couched in terms of consumer service. For instance, it is believed that only through corporate organization can satellite telecommunications be provided efficiently to the end-user. End-users are seen as an homogeneous group, and thus absent is any consideration of which end-users are benefiting, and which, if any, end-users will suffer. By concentrating on the need to service large corporate users, and gearing

organizational change to this purpose, we can say that what is actually occurring is a transfer of power to these users. Schiller and Fregoso (1993: 220) argue that this is the primary objective behind the movement towards private digital networks, and the concurrent liberalization and privatization of public networks:

... the concerted drive to privatize telecommunications should be viewed as an effort to create a thoroughgoing global foundation for systemic corporate exploitation of information.... The objective was to create truly private *transnational* systems for information processing and transport, not only across the developed market economies but also across the less developed states and, less predictably, Eastern Europe. (emphasis in original)

Schiller and Fregoso point out that the issue here is really that of control.

Commodification, achieved through liberalization of markets, construction of private networks, and privatization of public networks allow for the interests of those wishing to exploit telecommunications for commercial purposes to become central to network planning, implementation and utilization. We also see evidence of the overlap between the processes of commodification and spatialization. The commodification of telecommunications, already prevalent in the developed world, is intended to extend the informational control of transnational corporations into the Third World.⁴³ Schiller and Fregoso (1993: 225-6) note this potentiality with a specific reference to Iridium.

The Commodification of Information

The tendency towards commodification of telecommunications, with MSS as an exemplar, is also fueled by the concurrent commodification of information. Indeed, when we consider the desire on behalf of transnational corporations to

⁴³ Indeed, as we shall see in the next chapter, there are also profound spatial implications in the developed world's emphasis on negotiating telecommunications in trade fora such as GATT

control telecommunications networks we must ask for what purpose. Control not only includes the actual physical control of the networks, but must also be seen to include the control of content. Information itself must therefore be considered a commodity. Dan Schiller (1988) argues against traditional considerations of information as a resource, for this notion tends to ignore the social relational dimensions of information production, transmission and consumption. Instead, we must make a distinction between the consideration of information as a resource and its role as a commodity:

As against the postindustrialists's assertion that the value of information derives from its inherent attributes as a resource, we counter that its value stems uniquely from its transformation into a commodity – a resource socially revalued and redefined through progressive historical application of wage labor and the market to its production and exchange. (D. Schiller, 1988: 41)

This historicist approach agrees with Mosco's consideration of commodification as a process, and allows us to conceptualize the use of information as an historically conditioned activity.

While considering the process of information commodification, Mosco points to the creation of the cybernetic commodity. This refers to the use of information technologies themselves to *create* marketable information that would otherwise not have existed, something he sees as intrinsic to the entire process of commodification. He argues (forthcoming: Chap.4-pp.21-2):

Commodification demands the use of measurement procedures to produce commodities and monitoring techniques to keep track of production, distribution, exchange and consumption. ... These practices are part of the commodification process because the information they produce is used in the production of commodities, ... and are cybernetic because the outcome of the information production process is the production of a new commodity.

The cybernetic commodity is an intrinsic product of MSS, whether global or regional. This cybernetic commodity may be information directly marketable by

MSS users, or information that may enhance the attractiveness of MSS to potential users. For instance, current applications of mobile satellite technology for fleet management allow users to monitor the position of individual vehicles over a widely dispersed area. According to Laura Goode (1993: 8A), a marketing strategist with the American Mobile Satellite Corp.:

... a trucking company dispatcher can plan routing to maximize the utilization of each truck and enhance service to the company's shipper customers. The data transmitted to and from trucks can be integrated into the company's host computer for accounting applications such as billing, payroll, and fuel tax calculations.

As Goode points out, the key here is enhancing the services offered by firms using MSS as a monitoring technology. Forgotten here, though, is what amounts to greater surveillance of the workplace. Another example can be found in the application of current Inmarsat mobile satellite technology. Wright (1995) gives several examples of the production of cybernetic commodities, including the monitoring of electricity flows from South Africa to Mozambique and Botswana.

Mosco also points to metered telecommunications service, as opposed to flat rate service, as being able to create a cybernetic commodity. He states (forthcoming: Chap.4-p.26) that the practice itself "intensif[ies] the commodification process by refining the constitution and packaging of the message commodity and by using technologies that, in the process of producing the communications link, compile marketable information on the person initiating the transaction." MSS will most certainly allow for creation of this type of information, being designed from the outset as a metered system. The "complementary" nature of Iridium, for instance, with the service being marketed by Motorola's strategic partners alongside their current telecommunications services (Marek, 1993), will allow for the creation of more extensive user profiles. Another ramification of metered service, and the

cybernetic commodity, noted by Mosco is its application in extending the commodification process to areas previously based around principles other than exchange value, and areas excluded because of the inability of capitalist enterprise to monitor and measure, and hence create the cybernetic commodity. He argues (forthcoming: Chap.4-p.27):

... the commodification process has extended into places and practices that once tended to be organized according to a different social logic, one based on universality, equality, social participation and citizenship which, for all of its well-chronicled shortcomings, broadened the grounds of social action now increasingly reduced to a market logic that equates rights with market power.

Metered service is here equivalent to cost-oriented pricing which, as we have seen, is a principle enshrined in the GATS Telecommunications Annex. MSS, which is intended to serve as a primary telecommunications link for many areas of the Third World (Wright, 1995; Slack, 1995; Schneiderman, 1994; Hartshorn, 1992; Bertiger, 1991), thus extends commodified communications to areas which may now have no chance to develop telecommunications according to non-market based principles.

The rhetoric of MSS' application in the developing world, specifically to its ability to provide telecommunications to areas without existing service, seems predicated on geographical notions of universal service, rather than social considerations, and as such has much in common with early, corporatist visions of universal service.⁴⁴ Pyke (1995) forwards the notion of a global service obligation (GSO) as a way to guarantee consideration for the social dimensions of mobile satellite telecommunications. While admirable in intention, Pyke nonetheless ignores the commodifying dynamics of corporatized global

⁴⁴ The term "universal service" is generally attributed to Theodore Vail, the first general manager of AT&T. Consideration of universal service is pursued in greater depth in chapter five.

communications. She argues that GSOs are a matter of international regulation, yet fails to consider how the nature of commodified telecommunications, of which MSS is a prime example, is conditioned by its treatment as a tradable service. At a time when international telecommunications are discussed primarily in trade fora, and individual nations are abandoning public interest considerations of telecommunications in favor of market-based approaches, how does one seriously consider the effective implementation of a social policy such as a GSO at the global level? One has only to look at the transformations of Intelsat and Inmarsat to see how the process of commodification is changing satellite telecommunications. MSS, as a technology in an advanced commodified form, will likely be far more resistant to public service considerations.

Telecommunications as Public Utility and Public Space

When considering the social use value of telecommunications, a key question that arises is whether telecommunications creates a form of public space. To this end, we can note that in developed countries it has historically been characterized by principles of universal service. While this principle in the U.S. may have been the result of a political compromise between the federal government and AT&T⁴⁵, the result has been public consideration of telecommunications access as a right.⁴⁶ This compromise arrangement was

⁴⁵ In the United States, this compromise, worked out in 1913 between AT&T and the Department of Justice, essentially guaranteed AT&T a monopoly in long distance telephony, while requiring the company to guarantee a public service at reasonable rates. As Sterling (1995*) points out:

AT&T ... willingly submit to federal regulation, but in return, it ... use[d] the government's regulators as its own police, who would keep out competitors and assure the Bell system's profits and preeminence

This was the second birth -- the political birth -- of the American telephone system

fundamentally political, for universal service principles were meant to fulfill an essentially *social* policy: the provision of a public utility to all citizens. The provision of such utilities, electricity and roads are prime examples, is traditionally the purview of government. European states have historically delivered telephony as well, through state-owned Post, Telegraph, and Telephone companies (PTTs). Mosco (1994) highlights the social dimensions of Canadian telecommunications policy, arguing that policies stressing social goals have historically had the associated benefit of creating a more efficient telecommunications system. With respect to MSS, while social concerns are addressed somewhat by their boosters, *universal service principles*, as opposed to *universal coverage abilities*, barely register as a concern.

A related issue here is the question of the social and political features of network configuration. Davies (1994) argues that telecommunication network architectures, far from being determined by technological necessity, are in fact conditioned by political and economic factors. The historic decisions of states to pursue, for instance, either state-run monopolies (as in the case of western Europe) or privately-held regulated monopolies (as in Canada and the U.S.) are, according to Davies, due to factors unique to the political economy and political culture of each state. In her discussion of the evolution of the development of advanced telecommunications networks, Mansell (1993: 2) argues, "... political and economic factors ... are shaping the conception and development of intelligent networks...." The important insight both authors offer is the belief that network architecture is value-laden, incorporating the interests of some in society. It is also important to remember that network architecture is not a static

⁴⁶ Dordick (1991: 116) states this explicitly: "The provision of high quality universal service became a corporate tradition at AT&T. For the public it was perceived as an entitlement, if not a right."

technological arrangement. Telecommunications networks have historically been adapted to fit varying social, political and economic goals; AT&T's forced divestiture of its local operating companies is but one example. This allows us to conceptualize networks as sites of social contestation, fundamentally constituting them as a form of public space. Commodification of telecommunications thus represents the commodification of actual or potential public space. Viewing MSS through this lens, we see a global extension of commodified telecommunications through a geographically ubiquitous system. The network itself embodies the interests of private capital with no public oversight, and requires those who wish to make use of this system to submit themselves to a network configuration designed with the interests of the market at heart.

Telecommunications and the Commodification of Social Life

This discussion over whether telecommunications incorporates a form of public space leads us to the broader issue of communications as a facilitator of commodification in the wider political economy. When considering the extension of commodified telecommunications to areas of the developing world through MSS, we must also ask whether what is occurring is the broader commodification of public space. Herbert Schiller (1989) gives evidence that the second half of this century has witnessed a corporate takeover of public expression, with formerly public institutions such as libraries, schools and museums, among others, coming increasingly under the sway of market-based logic. While not specifically focused on telecommunications, Schiller's insights can be applied when we consider the potential use of telecommunications for political communication. The commodification of telecommunications,

particularly through the implementation of metered service, creates a situation in which free political expression through use of telecommunications technologies⁴⁷ is no longer "free"; access is no longer guaranteed and the greater the level of political activity, the greater the cost. While the provision of MSS to areas previously without telecommunications represents an introduction of a new means of political communication, I would argue that we must interrogate the nature of this new communication link, identifying it as primarily a commercial technology whose use is conditioned by market-based costs.⁴⁸

Mosco also reminds us that public space is simply a discrete, categorical entity, but politically contestable terrain intimately bound with considerations of private space. Speaking of public media, he states (Chap.4-p.63);

What we call the public media is public, not because it occupies a separate space, relatively free from market considerations, but because it is constituted out of a particular patterning of processes that privilege the democratic over commodification. To the extent that it does not, the expression *public media* diminishes in value. (emphasis in original)

Public and private spheres must be seen as mutually constitutive. Pike and Mosco (1986) conclude that policies of universal service in Canada are themselves the result of struggle between these differing principles. Thus with respect to telecommunications, policies of universal service represent a privileging of democratic principles over commodification, allowing us to consider telecommunications as representing a form of public, yet still contested space constituted through social and political struggle. If we take universal service

⁴⁷ Telecommunications is increasingly becoming an important tool of political campaigning, with phone banks and their use in soliciting the support of individual voters being a current example. With the advent of the Internet and community computer networks, known as freenets, the use of telecommunications as a medium for group-based political communication and organization is bound to become more prevalent

⁴⁸ I by no means wish to suggest that MSS itself represents a crucial tool for political communication. This would perhaps be too idealistic a sentiment to seriously put forth. My point is to suggest the potential political uses of MSS as one of a multitude of information and communication technologies

principles, and their consequent embodiment in state policy and regulation, as the primary indication of relatively non-commodified telecommunications, then we must acknowledge the state itself as being the primary site of political contestation, due to its role as regulatory guarantor.

Citing the work of Offe, Mosco (forthcoming: Chap.4-p.44) refers to the process of "administrative recommodification", whereby the interests of capital are seen as reasserting themselves against the socializing tendencies of some government activity. In this essentially political conflict, the role of the state is not simply one of neutral arbiter, brokering a zero-sum game between opposing forces of commodification and public interest. The state itself is intimately bound in this political conflict, incorporating and reflecting through policy the values of both sides at any given time. On the contrary, one can infer from this line of reasoning that the state, due to its being a site of political contestation and its bureaucratic nature, is itself not a singular entity. Different areas of government will at any given time reflect different values.⁴⁹ Applying this to the question of telecommunications, we can interpret demands on behalf of corporate telecommunications providers domestically, and MSS providers, for less regulatory oversight as an attempt at a form of administrative recommodification. The governments of developed states have generally looked favorably on these demands, and regulatory bodies such as the FCC in the U.S. and the CRIC in Canada, often staffed with industry people, have increasingly liberalized telecommunications. This has been accompanied by a simultaneous rearticulation of public interest considerations by these same regulatory

⁴⁹ An excellent example is the Canadian federal government. The Ministry of Canadian Heritage, which deals with issues of Canadian culture, often finds itself at odds with the Ministry of International Trade, due to the former's attempts at preserving Canadian cultural industries in the face of overwhelming levels of American cultural content flowing in to Canada.

bodies⁵⁰; the free market is now seen as the best way to facilitate universal access. By embracing the principles of the market, not just at the expense of public interest considerations but *because* of them, it can be argued that the state is itself more and more subject to the process of commodification.

When considering the commodification of the state, a process intimately tied to the processes of spatialization and structuration, it is important not to overstate the role of telecommunications in general, or MSS in particular. Technologies such as these in no way have direct causal influence on the commodification of the state; to argue this would be to drastically overstate the power of these systems, and to flirt dangerously with crude technological determinism. Yet telecommunications, particularly global systems epitomized by MSS, are technologies that are touted by their boosters as having immense economic benefits, particularly for the United States, whose industries are at the forefront of global telecommunications. The comments of Mike Synar, a former Democratic Congressman from Oklahoma, are a prime example of this sentiment. Speaking of the U.S. spectrum proposal to WRC '95⁵¹, he stated, "... we have worked very closely with the private sector to construct what we believe will provide our industry and this country with the spectrum it needs to keep its position as the premier provider of satellite technology around the world, while creating millions of high-wage jobs at home." (cf. Saunders, 1995c: 20) These comments persist in an environment where telecommunications firms continue to cut employment levels.

⁵⁰ See, for instance, Sikes (1992) and Roseman (1993)

⁵¹ Synar was to head the U.S. delegation to WRC '95 until he was diagnosed with an inoperable brain tumor.

The faith on behalf of the state in the power of capital to spur economic growth and recovery is not new. The state in capitalist society has always protected the interests of capital, for example through guaranteeing the right private property and capital accumulation. However, this faith has now taken on a new significance. Cox (1987) argues that what we in the West are witnessing is nothing less than the breakdown of what he terms the neoliberal historic bloc, the social consensus that provided the "unwritten constitution" of post-W.W.II western industrial society, with the state reaffirming its affinity with the interests of capital. This notion is also consistent with that of recommodification, and consequent trends towards lessened government oversight of corporate activity.

With respect to the Third World, however, it is difficult to speak of recommodification of the state. States showing any socializing tendencies have typically had to face the wrath of the developed world and its global economic institutions. Sussman (1995), though, gives us the notion of the dependent-integrated state, a model that allows us to view a Third World state in a commodified form, yet retains an historicist approach that acknowledges the dynamic nature of the commodification process. Often conditioned by historic material and social relations, the role of telecommunications in the dependent-integrated state is today essentially one of facilitating integration with the global economy. Speaking of the Philippines, Sussman (1995: 103) states:

Developed within a colonial and postcolonial political economy, Philippine mass media and telecommunications are dissociated from social development. As a result, the potential value of these instruments to the state is lost to supra-state interests. In telecommunications, the state largely functions as a World Bank vehicle for funneling loans for infrastructural development to aid the process of transnational accumulation. The benefits of deregulated competition, such as multiple service providers and price reductions, have gone largely to transnational end users.

We must thus ask how MSS, as a global telecommunications system marketed to the Third World, will affect states in the Third World. Are states who avail themselves of this technology, and consequently become dependent on transnational corporate providers, likely to utilize MSS as a social policy instrument? If existing telecommunications systems serve as instruments of integration, will MSS serve the same purpose? Who in these states is likely to use this technology? While definitive answers cannot be provided as yet, we can speculate that given current trends, MSS will be a facilitator of deeper dependency-integration.

Commodification represents the first entry process proposed by Vincent Mosco (forthcoming) into the political economy of communication. This process, referring to the transformation of use values into exchange values, provides an excellent point from which to begin an analysis of MSS. Recent trends in the articulation of telecommunications as a tradable service rather than a public good, as exemplified in the rise of fully private networks and telecommunications' inclusion in the GATS, provide an historical context from which to view MSS as a form of commodified telecommunications. MSS also has a potential use in the creation of new cybernetic commodities, themselves marketable commodities. Domestic regulatory concerns are now superseded by international trade considerations. We also see a transformation of public satellite telecommunications providers, partially as a result of challenges faced by new modes of delivery such as MSS, into more market-oriented, hence commodified, forms. The state itself is also undergoing the process of commodification, with telecommunications playing a large part. MSS represents a technology touted by those in government as being able to fulfill public service goals such as employment. MSS, though, is not to be seen as a causal factor in the process of

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commodification. It is simply a representative technology that highlights the ongoing commodification process within a broader social totality.

Chapter 4

MSS and Spatialization

This chapter will involve the analysis of MSS with respect to the second of Mosco's proposed political economic processes: spatialization. This process is, on the surface, the most obviously applicable to MSS. This technology, representing unified *global* telecommunications networks, transcends the spatial limitations of traditional terrestrial telecommunications. Physical location will no longer be an important factor in the accessibility of telecommunications. Closely associated with this spatial reconfiguration is a concurrent reconceptualization of temporal relations. Assumed here is a fundamental interrelationship between space and time. The altering of spatio-temporal relations has important ramifications for the organization of business, government and society, and it is here that this analysis will be grounded. While MSS gives rise to many decentralizing tendencies commonly associated with mobile communications, there is also the potential for new forms of centralization to take place. MSS will likely be a medium for the extension of corporate power, giving transnational corporate actors new flexibility in the implementation and utilization of communications networks. Effective utilization of MSS by business assumes that such a business is operating transnationally. The decisions of firms to locate or operate in a given area, will also be influenced by the flexibility offered by MSS. The state is also not immune to such spatio-temporal alterations. Shifting corporate power relations will certainly have implications for state activities. However, before we begin with the analysis, it is important to provide a clear explication of the process of spatialization as it will be applied here.

Spatialization Defined

Spatialization refers to the process of the transformation of space and time. Specifically, the purpose of this chapter is to critically explore the role of mobile satellite communications in this process.⁵² As the study of commodification is grounded in a Marxian concern over the transformation of use values into exchange values, spatialization is grounded in the Marxian concern over the tendency of capital to annihilate space with time. A primary concern here is in seeing the mutually constitutive relationship between space, capital and social relations; space is not to be taken as a passive given, but a constructed feature of social life that, in turn, influences the social relations that fashion space/time. Lefebvre (1979: 286) argues, "Space is permeated with social relations; it is not only supported by social relations, but it is also producing and produced by social relations." By viewing space in this active sense, we can better theorize the spatial activities of capital in its attempt to globalize. Spatialization witnesses, among other things, the creation of commodified space; space which, in turn, works to deepen and extend itself, hence recreating the social relations that give rise to its creation.

With respect to the political economy of communication, Mosco (forthcoming: Chap.5-p.1) illustrates two general reasons why spatialization is of primary concern, "First, communication processes and technologies are central to the spatialization process throughout the wider political economy. Second and partly because of this, spatialization is particularly significant in the communication industries." While this dual concern is reminiscent of the approach taken for the analysis of commodification in the previous chapter, this

⁵² While the relations between space, time, power and capital are themselves subject to vigorous theoretical debate (see, for instance, Massey, 1992, 1993), the purpose of this chapter is not to engage this discussion in depth, but to utilize many of its collective insights.

chapter will not use this distinction as a structuring principle. Rather, it may be more useful to organize this chapter around the examination of specific features of spatialization, and how MSS relates to them. These two general features referred to by Mosco, while separate on the surface, are nonetheless related. One cannot consider the extension of capitalist space apart from the extension of its informational control apparatuses, embodied to a large degree by global telecommunications networks and the spatial agency of global telecommunications firms. This belief represents the key consideration of this chapter; global mobile satellite systems provide transnational corporate enterprise with the ability to globally extend their informational space, and create a market for telecommunications that is global in nature. The theoretical usefulness of Mosco's use of spatialization in the political economy of communication, and hence its suitability here, is it allows us to view a technology such as MSS not solely as an objective mechanical artefact, but as a physical agglomeration of social relations. MSS can thus be seen as the material manifestation of the *need* of transnational enterprise to have globally ubiquitous information and control networks.

Telecommunications, MSS and Space/Time

We must begin our analysis of MSS and spatialization with a consideration of the reconfiguration of space/time engendered by telecommunications in general. As noted above, the concern over capital's power over space and time is deeply rooted in Marxian theory. According to Mosco (forthcoming: Chap.5-p.2), this concern "refers to the growing power of capital to use and improve upon the means of transportation and communication, to shrink the time it takes to move

goods, people, and messages over space, thereby decreasing the significance of spatial distance as a constraint on the expansion of capital." This tendency of capital has been effectively characterized by Harvey (1989) as "time-space compression." Absent the central role of capital, the reconfiguration of space/time can also be found in traditional liberal theory. Cleveland (1986), as noted in chapter two, argues that information and communication technologies serve to flatten hierarchies and give rise to "the passing of remoteness." This sentiment often finds itself expressed in an emphasis on the need, if not inevitability of organizational decentralization. This emphasis, however, obscures an important dimension of what is actually being witnessed: the spatial expression of capital at the micro level.

Similar to Cleveland, Drucker (1993: 60) believes that organizations in a "post-capitalist" society based on the transmission and utilization of knowledge will necessarily assume a decentralized character:

... post-capitalist society has to be *decentralized*. Its organizations must be able to make fast decisions, based on a closeness to performance, closeness to the market, closeness to technology, closeness to the changes in society, environment, and demographics, all of which must be seen and utilized as opportunities for innovation. (emphasis in original)

Nilles et.al. (1976) point to the necessity of telecommunications for firms wishing to decentralize. These sentiments lack a critical focus and rely on a simplistic and static dichotomy emphasizing geographic centralization versus decentralization. What is missing is a sense of the control and coordination functions essential to the maintenance of capitalist corporate organization⁵³, and the dynamic nature

⁵³ In fairness, Cleveland (1987) has argued that while informational ubiquity as he sees it challenges notions of centralization, the result is not *decentralization*, but "mutual adjustment", a term he borrows from Charles Lindblom. He believes decentralization "is simply an effort to preserve hierarchical procedures when your organization gets too large for grandpa to know everything." (1987: 14) However, this sentiment seems rooted in a technologically deterministic viewpoint that rejects both centralization and decentralization as outmoded and redundant organizational forms doomed to inevitable failure. This belief is,

of the transformation of control mechanisms. A more useful interpretation of current organizational shifts such as those facilitated by telecommunications is offered by Massey. Referring to spatial divisions of labor in Britain, Massey (1995: 184) illustrates the need for central coordination within capitalist organizations, noting that, "... in almost all cases of decentralisation, whatever the size of the firm, a head office is retained in London. In other words what is occurring is not just a geographical shift *in an industry* but the development of a *new use of space*." (emphasis in original) "Decentralization" can be better seen as referring to particular organizational *activities* - the physical location of manufacturing or assembly operations being prime examples - rather than a holistic descriptive characterization of organizational philosophy. Organizational structure must be seen in this dynamic light, with consideration focused upon the spatial transformation of control mechanisms through use of telecommunications rather than static features of physical geography.

On the surface, MSS allows firms to meet many of Drucker's requirements for organizational decentralization. The technology facilitates a connectedness to subjects that is literally global in character. However, MSS will more likely assist in redefining the nature of centralization. Historically the telegraph and railroad have served such a role. Chandler (1977) illustrates how these technologies, and the dispersed spatial operations enabled through their use, facilitated a "managerial revolution" in early American corporate organization. Organizational power shifted away from the actual proprietors of a firm to professional managers, through the creation of a need for information control and management. This change effectively helped to create the modern bureaucratic corporation. This change also seems to meet several of the criteria

in my opinion, eminently contestable. "Mutual adjustment" as Drucker's conception of decentralization suggests a lack of consideration for the asymmetrical power relations inherent in capital

of decentralization posited by Drucker; power was shifted from a single owner or set of partners to a larger group of managers, operations were conducted across a much larger geographical area, and telegraphic contact allowed for greater inventory control, faster acquisition of market information and a greater ability to meet customer needs. Yet, as Massey has noted with current British industrial geography, head offices have remained an important feature of corporate organization. The ability to decentralize an organization must not be seen as superseding the necessity of maintaining informational control within that organization. This function is best carried out in a single, hence *central*, physical location. It is thus more helpful to think of telecommunications as allowing a reconfigured centralization, rather than creating the conditions for decentralization.

A current illustration of reconfigured centralization can be seen in the utilization of existing mobile communications technologies. Combès et.al. (no date: 10) argue that the use of mobile communications gives those in positions of power within their organization a new degree of control over their work environment:

Mobile communication enables managers as much as independent entrepreneurs and professionals (contractors, architects, consultants, lawyers) to remain in central positions of power while moving about and enhancing their control of resources. We shall call this potential which legitimizes being both at the centre and on the periphery, "diffuse centrality". In this context we see that mobile communication provides a permanent link which gives rise to feelings of security, dismay and comfort – "one constantly knows what is happening".

This notion of "diffused centrality" is extremely useful, for it foregrounds the issue of centralized control over the informational resources key to corporate organization while maintaining a consideration for the active use and transformation of organizational space enabled by mobile communication

technologies. The notion of "centralization" here simply loses its geographical fixity; the firm still has a "center", though this center may be diffused through space and linked by telecommunications. Corporate organization takes on a far more flexible possibilities here. I do not mean to suggest that MSS will necessarily *cause* a firm to assume a more diffused organizational structure. It is the flexibility and choice allowed by the use of MSS that is the important consideration. Combès et.al. (no date: 13) also allude to changes in organizational space an enhancement in the division of labor facilitated by mobile communication; "only staff with a degree of decision making power can exploit this type of flexibility (executives, entrepreneurs, artisans, professional people), whereas operatives (long-distance drivers) are *subjected* to the constraints of organizational flexibility." (emphasis added)

This should not be taken as meaning that those with decision-making power have complete flexibility while those without have none. Workers with this power, while not subject to the same degree of control as those without, are not immune from the imperatives of a spatially diffused workplace. Rather, it is more helpful to consider this flexibility as existing on a continuum. Combès et.al. (no date) give us the notion of "urgency", whereby the actual utilization of mobile communication is based on the perceived necessity of communication. It could be argued that the control function here lies in the ability to define "urgency"; management are more likely to have the power to define "urgency" for themselves, while "operatives" will most likely have "urgency" defined for them. Hierarchical power relations within a particular organizational space are thus still maintained, despite a workplace which is spatially diffused. Other than urgency, another form of hierarchical control extended through space/time is surveillance.

The example of long-distance truck drivers given by Combès et.al. is especially useful for considering the surveillance features of MSS; regional mobile satellite technology is already being used for such a purpose (Goode, 1993). Locational data transmitted through MSS, while allowing shipping firms to better serve their customers through accurate cargo location data, also give management the ability to instantaneously track the movements and rate of movement of drivers. This has the function of providing effective surveillance of remote workplaces, analogous to the manager of a computerized workplace being able to monitor the keystrokes per minute of data-entry clerks. This type of data can be used by management to more efficiently control the workplace, creating ever-higher productivity goals and a workforce disciplined by the knowledge of constant surveillance (Gandy, 1989). With MSS, management is able to extend its control into what effectively becomes a diffused global workplace, while simultaneously gathering data that may assist in temporally intensifying the work day. Far from being a technology that affects a shift from a centralized organizational form to decentralized, MSS, and telecommunications more generally, must be seen as instruments which give a firm greater flexibility in reconfiguring its organizational space. The power to constitute production relations within a particular organizational space remains clearly in the hands of management, be they physically located at the firm's center, or part of a firm's "diffused centrality."

The issue of diffused centrality leads us to the question of whether a firm still needs a central physical location. Many liberal commentators seem to skirt this question altogether. Drucker (1993: 108), through his definition of the post-capitalist enterprise as a "knowledge-based organization", believes that all employees must share equally in decision-making responsibility, and, "All

members have to see themselves as 'executives'. Is this to mean that the entirety of a firm's operational space constitutes a headquarters, or that all employees will share equally in remuneration? This seems hardly likely. Masuda (1980: 5), through reference to the information society, idealizes away the notion of capitalist industrial organization altogether. "In industrial society, the most important subject of social activity is the enterprise, the economic group ... In the information society the most important subject of social activity will be *the voluntary community*, a socio-economic group that can be broadly divided into local communities and informational communities."⁵⁴ (emphasis in original) Both of these characterizations attempt to transcend the spatial manifestations of capital, by emphasizing the perceived pluralistic relations engendered by the formative role of information, rather than the social relations of capital, within organizations. MSS as a globally ubiquitous telecommunications network no doubt reinforces these idealized notions by making any point on the planet available to members of, in Masuda's words, a "voluntary informational communities." Again, the emphasis is effectively on organizational decentralization versus reconfigured centralization. Voluntary communities and knowledge-based organizations have little need for centralized command functions. By marginalizing the issue of power, hence the roles of coordination and control, the question of the *actual physical location* – the place, if you will – of these functions is also shunted aside.

⁵⁴ This sentiment seems quite similar to Cleveland's (1986) notion of "the twilight of hierarchy."

The New Global Geography of Telecommunications

A question thus arises as to *where* these headquarters functions will actually be physically located. Massey, in her earlier reference to decentralizing British firms maintaining headquarters in London, has pointed to the large urban area as a likely physical location. This assertion is supported by Harvey (1985: 216-7). He argues:

Urban areas ... compete for those key control and command functions in high finance and government that tend, by their very nature, to be highly centralized while embodying immense power over all manners of activities and spaces. Cities can compete to become centers of finance capital, of information gathering and control, of government decision-making.

Kellerman (1993: 115) supports this conclusion, bluntly stating, "The introduction of modern telecommunications means has accentuated the role of cities as service and control centres." The urban area in the age of information capitalism represents the most likely site for the physical agglomeration of corporate coordination activities. MSS, while not being an important causal factor by itself, nonetheless will reinforce the process of, as Harvey (1985) terms it, the "urbanization of capital." The utilization of MSS by any particular firm will no doubt be part of a wider telecommunications strategy. MSS provides specialized coverage for staff in remote locations where the use of traditional terrestrial telecommunications is unfeasible or impractical.

The above is an important point. In no way should it be understood that MSS will replace all existing forms of telecommunications. To do so would be to idealize this individual technology, resulting in a consideration of MSS as being separate from other forms of telecommunications. An example would be the assumption that firms could locate their headquarters anywhere in the world, because MSS would be able to provide it with a telecommunications link. This

scenario is indeed quite farfetched, and is tantamount to an idealization of the potential implications of MSS. It is fair to say, though, that MSS adds a new dimension to the geography of global telecommunications. Firms utilizing MSS will still have an important impetus to maintain terrestrial telecommunications links. If a firm is to effectively integrate the information made available through the use of MSS, it will have to have an efficient internal communications network. Physical proximity to the means of terrestrial telecommunications becomes an ever more important necessity.

One reason cities tend to attract this type of corporate coordination function is the current availability of advanced telecommunications. There has been ample literature recently dealing with the phenomenon of the "global city" (Sassen, 1994; Hepworth, 1994; Kellerman, 1993), cities which play a major nodal role in the functioning of the global economy. The emphasis is on the functioning of cities such as New York, London and Tokyo (among others) as global hubs of finance and communication. Lesser cities such as Toronto, Frankfurt and Manila, serve as regional hubs, providing gateway services through which global hubs connect with peripheral areas. Key here, whether assumed or explicitly stated, is the accessibility of advanced communications facilities. We must thus ask whether MSS will exacerbate this "global city" phenomenon. It is helpful here to consider the geography of terrestrial telecommunications development. This development is strongly influenced by the inter-city geography of the global economy. Sussman's (1991b) study of Philippine telecommunications development has shown an overarching concern on behalf of Philippine telecommunications interests in concentrating new infrastructural capacity within metropolitan Manila, and geared towards serving the needs of transnational corporations. MSS is clearly not meant, nor does it have the capacity to replace

this type of high-capacity infrastructural development. MSS, rather, is intended to reduce the need for rural telecommunications development in the Third World. To what degree MSS will substitute for terrestrial telecommunications is still a matter of speculation, yet it is not unreasonable to conclude that MSS will reinforce the position of global cities within the world economy by diminishing the rationale for intensive telecommunications development in rural areas; if MSS provides adequate service, then why install terrestrial infrastructure?

This conclusion is further supported by the requirement of MSS for terrestrial gateways. As described in chapter one, MSS systems are not intended to operate as stand-alone networks. All systems involve routing their calls through public switched telecommunications networks. As Marek (1993 :12) has noted, "A key selling point for Iridium investors was that Iridium services are to be administered through home gateways to be owned and operated by investors in their respective nations." While it remains to be seen whether these gateways will be located within hub cities, it is clear that proximity to terrestrial networks is a requirement. The existing geography of telecommunications networks will most certainly influence gateway location. MSS investors/gatekeepers are predominantly existing telecommunications firms, thus gateway location decisions are likely to be made by firms who bear considerable responsibility for the existing spatial configuration of telecommunications. It is reasonable to assume that these decisions will likely be influenced by the same thinking that has led to cities becoming telecommunications hubs. A question also arises as to whether firms which make extensive use of MSS will be able to integrate this traffic into any private, intra-firm networks that they may have. This is a likely scenario, given the growth of private, leased telecommunications network usage among transnational

corporations (see Langdale, 1989; Schiller and Fregoso, 1993). These systems also make use of global, national, and regional telecommunications hubs, and as such we can conclude that private leased networks add a further incentive for MSS investors to locate their gateways near such locales.

Far from being a technology that removes spatial considerations as a feature of telecommunications access, MSS reinforces existing spatial biases. While MSS may facilitate the phenomenon of the rural "electronic cottage" for some, the technology will more likely exacerbate existing schisms between rural and urban areas. MSS will likely serve as a form of wireless "telecommunications of last resort" for those in rural areas unlikely to be served by other forms of wireless telecommunications such as cellular or personal communications services (PCS). In a study focusing on the use of mobile satellite communications to provide local telecommunications access, Robinson et.al. (1993: 132) conclude, "... satellites will provide thin route local loop [i.e. local service to areas with low population densities] services in the future. Otherwise thin route areas risk being left out of the wireless revolution because they are unlikely to be served by terrestrially-based PCS providers." Assumed here are substantial rural areas that will not see any PCS development, an assumption no doubt based in part on the fact that PCS will not be subject to any form of universal service regulation.

The level of service suggested by Robinson et.al. is in fact of a lower quality than current fixed telecommunications. While offering the same level of voice and fax service as existing telecommunications services, Robinson et.al. (1993: iii) propose a data transmission rate of 9600 bits per second (baud). This compares to the widespread use of 14,400 and 28,800 baud modems today. This begs the question of whether rural areas will ever see service equivalent to urban centres. The very existence of MSS may well preclude the possibility of

terrestrial telecommunications development in rural areas; why add capacity when MSS fills the gap? Alles et.al. (1994) give evidence that current telecommunications distribution patterns already favor large cities, and serve to reinforce the large city-small city hierarchy within the contemporary urban system. This line of reasoning can perhaps be extended: MSS may serve to structurally marginalize rural areas with respect to the contemporary urban system, by creating area with levels of service even lower than small cities.

MSS, Power, and Space

So far, we have discussed several features of the process of spatialization: the geographical extension of organizational space through use of telecommunications, the spatial transformation of corporate hierarchies through the notion of "diffused centrality", and the influence of corporations (and their need for telecommunications) on the geography of urban systems. While the first two features discuss the process of spatialization at essentially the micro level of individual organizations, the last one points to processes of spatialization at work within the wider political economy, particularly with respect to corporate influence. With this in mind, we can orient ourselves towards the explicit question of the spatial dimensions of corporate power, and how this works to create new spatial configurations at the level of the wider political economy. We must now consider how corporate power manifests itself within global society. A useful model to utilize here is provided by Massey (1992; 1993): the concept of power-geometries. According to Massey (1992: 80-81):

'Space' is created out of the vast intricacies, the incredible complexities, of the interlocking and the non-interlocking, and the networks of relations at every scale from local to global.... It is not the 'slice through time' which should be the dominant thought

but the simultaneous coexistence of social relations that cannot be conceptualized as other than dynamic. Moreover, and again as a result of the fact that it is conceptualized out social relations, space is by its very nature full of power and symbolism, a complex web of relations of domination and submission, of solidarity and cooperation. This aspect of space has been referred to elsewhere as a kind of 'power-geometry'.⁵⁵

Power-geometries allow us to conceptualize forms of power as being dynamic through space and time. Corporate power can be seen as intersecting at a multiplicity of levels with the power of states, cultures, communities and other corporations.⁵⁶ The power relations between these and other social entities provides for a power-geometry, a configuration dynamic and ever-changing. The utility of power-geometries here is it allows us to effectively situate corporate MSS providers within the dynamic environment of global telecommunications and, in turn, situate global telecommunications within the broader political economy.

When considering the power-geometry of global telecommunications, it is helpful to look at the process of commodification. As argued in the previous chapter, the dynamic of global telecommunications is today characterized by its treatment as a tradable service rather than a public good. MSS represents a prime example of this. The social power of capital is evidenced by the attempt to transform social relations through an overarching application of the concept of exchange value. This can also be interpreted as representing an important shift in the global power-geometry; we see a stronger articulation of corporate power and space at the expense of public interest as manifested in the notion of

⁵⁵ This reference cites Massey (1993).

⁵⁶ It must be noted that my use of Massey's model of "power-geometries" does not represent the full depth of this concept. Massey is concerned with what she sees as the economic reductionism of Harvey's (1989) notion of time-space compression. Her formulation of power-geometries represents an attempt to theorize a place for gender, ethnicity and other forms of social power as elements in the dynamic construction of space.

telecommunications as a public utility. Another illustration highlights the increasing power of private telecommunications providers, as they are now able to directly project their interests into international fora such as WARC '92. These institutional developments can also be seen as representing a form of power-geometry. The institutional space of an entity such as WARC/ITU has fundamentally changed, for the power relationships embodied in it have themselves been altered. No longer is this a forum solely for the articulation of the power (or lack thereof) of states. Corporate interest, and hence corporate power, now finds itself an active, important and direct participant. Thus the power-geometry, which before represented the shifting relations between states and/or blocs of states now incorporates the power of transnational capital as a direct participant. New players constitute a new power-geometry.

This should not suggest a diminishing of the notion of states representing the interests transnational corporations. Quite the contrary: the interests and needs of transnational enterprise are seen as an essential component of the involvement of capitalist states. These interests often finds expression through the power of these states and, as such, have historically been an important aspect of this particular power-geometry. The fundamental difference is that the expression of corporate power is now no longer solely channeled through the power of a particular state. What this amounts to is a new global spatial configuration foregrounding the power of transnational corporate enterprise. MSS can be seen as a symbolic extension of this power across the entire globe. The use of telecommunications as an integrative tool of corporate organization is key. The "diffused centrality" of Combès et.al. (no date) not only represents a transformation of organizational space (i.e. a shift in the power-geometry within an individual organization) but a fundamental extension of corporate power-

geometries as a whole. MSS as a potential tool in the realization of a globally diffused workplace clearly plays a role. We must always bear in mind the global vision that underpins the very idea of MSS. These systems have been conceived and designed from the outset as global networks, with an eye towards servicing the interests of global users. This is not to suggest that corporate power will necessarily be extended to all parts of the globe, nor will it necessarily assume a determinant role in the places it is extended to. The important thought here is the potential and flexibility offered by MSS, and the fact that power-geometries previously free of the influence of corporate power may now be transformed to varying degrees by its agency.

It must be borne in mind that corporate power itself constitutes a particular and dynamic power-geometry. Corporate power may be seen as a unified symbolic space only at the broadest level of the global political economy where, for example, it expresses itself through a desire for the quantification of social relations through the process of commodification. Corporate power can here be conflated with the power of the capitalist economic system as a whole. But we must always bear in mind that one of the important principles of the capitalist economic system is that of market competition. It is at this level that we can effectively speak of inter-corporate power-geometries.⁵⁷ The simplest way of envisioning this is through reference to the actual competition between firms: Iridium competes with Odyssey competes with Globalstar. This simplistic model is no doubt the most easily conceived, for it foregrounds the presupposed competitive nature of market capitalism. Anti-competitive behavior such as media concentration and price gouging would be concerns, albeit to varying

⁵⁷ With this in mind, preceding discussions of the transformation of organizational space could perhaps be referred to as dealing with intra-corporate power-geometries.

degrees, for both critical political economists and liberal economists alike. Yet this model only represents one form of inter-corporate power-geometry. Another arrangement referred to by Mosco (1993: 25) is "flexible forms of corporate power." While encompassing market competition, this particular focus emphasizes corporate practices such as strategic alliances and partnerships. The important consideration here is firms no longer *solely* compete with one another; often they now cooperate.

Strategic alliances and other flexible forms of corporate power are important to understanding the spatial implications of MSS. They are crucial to the feasibility of all MSS projects, and give all projects an essentially transnational character. The Iridium consortium, for instance, sees involvement from British, Indian, Thai, German, Korean, Russian, Chinese, Canadian and Taiwanese firms.⁵⁸ Each project is also distinguished by what types of firms are being utilized as strategic partners, and in what capacity they are participating. The degree of participation and responsibility of strategic partners is often conditioned by the particular financial and organizational arrangements specified by the MSS provider. These arrangements constitute a particular organizational power-geometry, itself incorporating the power-geometries of the participating firms.⁵⁹ The utilization of strategic partners provides an example of a corporate power-geometry based on consensual arrangements. Globalstar's organization illustrates the hierarchical nature of MSS power-geometries. For example, Globalstar uses different partners for design and development, launch service, telecommunications service provision and terminal equipment provision, and distinguishes between "telecommunications service providers" and "local and

⁵⁸ The extent of strategic partners has led one observer to characterize the Iridium project as "growing like a private version of INTELSAT." (Rees, 1994)

⁵⁹ This may be considered analogous to the idea of interlocking corporate cultures.

regional service providers." (Globalstar, 1996*) "Telecom service providers" such as Dacom/Hyundai, Airtouch Communications, Vodafone and France Telecom/Alcatel have been granted the exclusive right to offer service in broad regions in which it has marketing experience. These firms, in turn, contract with other firms to provide local and regional service. All firms involved are private companies. The hierarchy of firms here is quite explicit: Globalstar is at the top, in control of licensing criteria, next are the major contractors with exclusive franchise rights granted by Globalstar, and finally we have regional and local partners or subcontractors responsible to the major partners. Seen in this light, the hierarchical relations constituted by this particular arrangement serve to centralize control, as well as guarantee a fully private network from top to bottom.

The spatial power-geometry of MSS providers must also be seen as interacting with other entities within the broader political economy. Competition between ICO and Iridium clearly highlights this. At one level, we see the simple interaction between two market competitors in search of investors and markets. At another level, we see how the dynamics of MSS competition interact with states, international organizations and other institutions. The privatized, corporate nature of ICO itself bears witness to these dynamics. According to ICO (1996*), "The new company combines commercial and investment flexibility with the benefit of strong commercial and technical heritage from Inmarsat to form a powerful new corporate vehicle to maximise potential success in an increasingly competitive environment." Rhetoric aside, statements such as these are quite revealing, for they highlight the assumed belief in the necessity for private corporate provision of MSS. A project formerly controlled by an international,

non-profit satellite cooperative, Inmarsat, now assumes a privatized organizational model.

We must also consider Motorola's opposition to Project 21/ICO noted earlier. This opposition, it will be remembered, was based in a belief in the preferential treatment afforded Inmarsat by many states, due to its status as an intergovernmental agency. This manifested itself in an appeal by Motorola to the FCC which attempted to have the U.S. Inmarsat signatory, Comsat, barred from participating in Project 21. Without wanting to draw a causal link between the actions of Motorola (on behalf of Iridium), the FCC (as an agency of the American government), Inmarsat and the privatization of Project 21/ICO, it is sufficient to note the correlation between these actions. The interplay between these various organizations, and hence the intersection of their organizational spaces and the power-geometries manifested within and through these spaces, has produced a renewed emphasis on private provision of MSS. One could argue that the particular power-geometry of Inmarsat has changed to reflect the interests of private capital, internalizing an orientation towards "an increasingly competitive [read: commodified] environment."

MSS, Power-Geometries and the State

At this point, it would be helpful to restate the proposition being presented here. Social structures and institutions are seen as occupying a particular space. This space is conceived as being dynamic, constituted out of the various power relations at play within that space. Agnew and Corbridge (1995: 3-4) provide a useful illustration with their conception of "geopolitics":

By geopolitics we understand the division of global space by institutions (states, firms, social movements, international organizations, armed forces, terrorist groups, etc.) into discrete territories and spheres of political economic influence through which the international political economy is regulated materially and represented intellectually as a natural order of 'developed' and 'underdeveloped', 'friendly' and 'threatening' areas. It is that set of socially constructed, rather than naturally given, practices and ideas through which the international political economy is realized geographically.

However, rather than see institutions dividing space into "discrete territories and spheres of political economic influence", it would be more useful to consider institutional space as permeable and subject to interpenetration, and to consider power relations as being constituted out of these spatial relations. These relations can be effectively characterized as a particular power-geometry. These exist at a multiplicity of levels, from the individual corporation or state, to the international arena, to the global political economy.⁶⁰ At the level of the firm, telecommunications facilitates spatial extensions of operations through the global political economy, simultaneously allowing firms to transform both internal power-geometries, and the external power-geometries which they find themselves interacting with. With MSS, potential extension becomes literally global in character, if not in practice then at least symbolically. MSS has provided an effective rallying point for private corporations wishing to project themselves into international fora. These systems are effectively challenging the existing power-geometry of international satellite telecommunications, previously the responsibility of state agencies. As such, we must thus consider how the dynamics of MSS competition directly intersect with states.

An interesting aspect of the interaction between MSS providers and states can be seen in the efforts of the Iridium project to secure the direct participation

⁶⁰ In fact, one may also wish to speak of small group or inter-personal power-geometries, although this is not the focus of this chapter

of states. According to a Bloomberg (1995) business report, "The Washington-based company said it plans to sell equity stakes of \$275,000 [U.S.] each to entities selected by governments around the world." This development is curious, for the equity represented by this offering, even if all countries agree to purchase, is far short of the financing sought by Iridium. Rather, this offering intends, according to Iridium, to "extend the shareholder base of Iridium Inc. to ultimately represent worldwide ownership." (c.f. Bloomberg, 1995) Clearly this is far more of a symbolic gesture than an actual attempt to diffuse ownership; these shares represent a minuscule portion of the entire cost of the project. This development may also be seen in light of Motorola's opposition to ICO/Project 21. By reaching out directly to states, Iridium may be trying to undercut some states' preexisting relationship with Inmarsat, hence ICO. They may also be trying to overcome a bias towards ICO/Inmarsat due to the extensive utilization of Intelsat by states. Such a bias might arise out of a familiarity with Intelsat/Inmarsat organizational structures and principles. ICO, though privatized, may be seen as a more "comfortable" organization to deal with. Iridium may also be trying to circumvent other MSS providers by appealing directly to states, rather than attempting to force them to adopt a liberalized market structure.

So far, this chapter has concentrated primarily on overtly economic aspects of spatialization: spatial organization of firms and the global extension of corporate power among other topics. However, Mosco (forthcoming: Chap.5-pp.60-1) reminds us of the fundamental interrelation between the economic and the political:

There is certainly ample evidence to support the view that the contemporary state has reacted to changes in corporate industry and structure, as well as to changes in technologies and services. Nevertheless, there is also support for the view that these changes

have come about with the active legal, regulatory, and policy direction of the state. In fact, there is enough support for the latter to warrant the conclusion that political economy would benefit from a greater emphasis on the *political*, calling for attention to the *constitutive* as well as the reactive role of the state in the communication industry. (emphasis in original)

MSS in many ways offers an excellent case study for considering the constitutive role of the state with respect to telecommunications. Situating MSS within the historical development of international satellite telecommunications allows us to see how American state activity has created a space for the provision of private satellite services. We can also refer to the licensing of global MSS systems by the FCC. In fact, it is easier to think of the activities of the U.S. as being constitutive rather than reactive, for the simple fact that the technology itself would not exist without substantial government intervention. LEO technology, as other satellite technology before it, was made possible primarily through military research and development funding. As well, conceptions of the spatial dynamics of state activity is intimately tied to the process of commodification. As we must consider commodification of international telecommunications, we must also ask how this emanates from the state level. Again, it is helpful to consider this in terms of power-geometries; how is the particular power-geometry of a given state transformed through the process of commodification? To better understand this dimension of state power, Mosco (forthcoming: Chap.5-p.64) gives us "four processes characterizing current state constitutive activity that emanate from both commodification and spatialization." These are commercialization, liberalization, privatization and internationalization.

Commercialization, liberalization and privatization are processes that are closely bound. All three essentially refer to the state's role in the transformation of social relations, in this case the adoption of a particular set of commodified social relations. Commercialization refers to the adoption of business principles

as the model for social, economic and political activity, while the goal behind state efforts at liberalization is more simple: to "increase market competition." (Mosco, forthcoming: Chap.5-p.66) Liberalization witnesses the movements of states away from regulation of the market, and is at the heart of arguments meant to gain market access for MSS. (see Roseman, 1993) In essence, it is a precondition for the utilization of some MSS systems within a given state. As we have seen, Globalstar appears to have allied itself primarily with private contractors. Thus we can assume that the states in which the system intends to operate have liberalized telecommunications markets. Often times this manifests itself in the privatization, or direct sell-off, of state telecommunications entities or in the licensing of competitors.

MSS is likely to accelerate the trend towards liberalization. For instance, if competition is not permitted within a state, then what may result is a regional patchwork of MSS systems. For example, Iridium might be forced to bypass the Brazilian market, due to the fact that Brazil's state telephone company has allied itself with Globalstar. This situation may generate pressure on states with monopolistic telecommunications providers to open their markets, and hence incorporate a commercialized value system. At the very least, states will be under pressure to allow MSS providers to operate despite the lack of domestic investors. The global scope of MSS necessitates such a liberalized global environment for its optimal operation.

The internationalization of states witnesses their coming together for purposes of general coordination of activities. With respect to telecommunications, we have already explored many of these activities in the preceding chapter. The treatment of telecommunications in international trade fora such as GATT, and its inclusion in the GATS, is a primary example of the

internationalization of the state with respect to telecommunications. While in the last chapter the emphasis was on how such an articulation potentially influences states (essentially a reactive analysis) we can here foreground the "voluntary" nature of state participation. While no doubt incorporating the interests of transnational capital, these fora do consist of the active participation of states. Thus we cannot consider the commodification of telecommunications without ascribing some degree of state sanctioning to it. The support for MSS spectrum allocations by developing countries at both WARC '92 and WRC '95 (see Mohan, 1992; Foley, 1995) also indicate that state activity plays a constitutive role in the adoption of MSS. Were it not for the active acceptance of MSS by developing states, it is unlikely that the U.S. would have gained the spectrum it desired for its MSS firms. An important question to ask is why has the developing world embraced this technology? This question is intimately tied with the almost religious belief in the power of advanced telecommunications to create prosperity. This question will be explicitly dealt with in the following chapter.

Spatialization is a process clearly associated with the development and potential utilization of MSS. The activities of states essentially create a space for the operation of commercialized and commodified value system. Telecommunications markets are liberalized, and pressure is placed on states within international fora to adopt such a market structure. This, in turn, gives private telecommunications providers such as MSS effective "room to operate"; the desire is for a single global telecommunications playing field. This allow firms utilizing MSS to potentially transform their own operating spaces, allowing for a reconfiguration of hierarchies. Each of these levels – firm, state, and international – can be seen as constituting a particular set of power-geometries, interacting with others at all levels of society. Each serves to further influence each other.

What is clear here is a trend towards an emphasis on commodified social relations, and thus a privileging of corporate space and power. We must now turn to why this sort of bias is occurring, and thus to the process of structuration.

Chapter 5

MSS and Structuration

This thesis has so far examined global mobile satellite services and their implications for the political economic processes of commodification and spatialization. The third chapter, that of commodification, attempted to situate MSS within the pre-existing dynamics of global telecommunications, an area of communicative life that is more and more subject to the capitalist imperatives of commodification. The previous chapter explored the potential of MSS as a factor in the transformation of spatial relationships, and concluded that the organization and utilization of this technology will likely contribute to an intensification and deepening of what amounts to the space of capitalism. This chapter, focusing on the process of structuration, will attempt to provide a critical assessment of MSS by situating the technology within the wider sphere of social practice. The principle concern is in seeing this technology as an important component of the emerging "information society", a notion rich with the ideological biases of capitalism. MSS is often touted as being able to bring this "information society" to all parts of the planet, creating a global society linked through the technological wonders of telecommunications. These claims must not be accepted at face value, but should be critically interrogated in order that we might gain a better understanding of what values will be embodied in this new form of "society", and what prospects exist for furthering the principles of equality and democratic communication.

Structuration Considered

The concept of structuration has been developed most notably by the English sociologist Anthony Giddens. Giddens' fundamental project represents an effort to bridge the theoretical chasm between perspectives foregrounding

the constraining features of structure versus those stressing the primacy of human agency: an attempt to provide a comprehensive theory to account for the constitution of social life.⁶¹ Its application to the political economy of communication by Mosco (forthcoming: Chap.6-p.3) is consistent with these broad aims of structuration theory, in that it recognizes the mutual constitution of structure and agency:

... structuration balances the tendency in political economic analysis to feature structures, typically business and government institutions, by addressing and incorporating the ideas of agency, social relations, social process, and social practice. At the same time, ... it rejects as extreme the notion that one can analyze agency in the absence of structures. This is because, structure provides the medium out of which agency operates.

An important focus here is on accounting for structural formation and transformation through human agency. Agency is seen as being fundamentally social; the activities of human beings cannot be abstracted from the lived networks (i.e. structures) of social relations that constitute the life-world of the individual. Thus agency is seen by Mosco as manifested through the social groupings, whether voluntarily joined or theoretically envisaged, that are a fundamental part of all of our lives, and taken together constitute the social totality:

From this use of structuration theory, one might think about society as the ensemble of structuring actions initiated by agents that mutually shape class, gender, race, and social movement relations. According to this view, society exists, if not as a seamless, sutured whole, at least as a field on which various processes mutually constitute identifiable social relationships. (Mosco, forthcoming: Chap.6-p.8)

The social groupings listed by Mosco above - class, gender, race, and social movements - are taken to be the fundamental, but not necessarily exclusive,

⁶¹ While finding a grounding in the conceptual models of Anthony Giddens, this chapter, is not intended as an in-depth discussion of the theoretical strengths and weaknesses of structuration. For secondary discussions of Giddens' work concerning structuration, see Bryant and Jary (eds.) (1991), Cohen (1989) and Craib (1992).

social groupings that constitute human society.⁶² Mosco reminds us that political economic analyses of communications must maintain a space for the consideration of the socially constitutive role of communicative practices.

MSS and the Hegemony of the Information Age

A key feature of Mosco's use of structuration is an emphasis on the social relations of hegemony. Briefly stated, hegemony refers to:

... the process of constituting the common-sense, taken-for-granted reality in society.... [H]egemony is the ongoing formation of both image and information to produce a map of common sense sufficiently persuasive to most people that it provides the social and cultural coordinates that define the "natural" attitudes of social life. (Mosco, forthcoming: Chap.6-p.51-2)

This is to be the starting point from which this analysis of MSS is to proceed. It will be argued that justifications for MSS are predicated on the ever more widely held belief that we are moving away from the industrial mode of organization that has characterized human society for the past one hundred years towards a new age based on the organization of knowledge and information, an "information age." While the selling of the "information age" bears the marks of ideology, in that it is a deliberate yet debatable interpretation of the current condition of capitalist society, the concept itself has arguably achieved the status of common sense. Illustrative of this are the widely held beliefs that our society has become dependent on information and knowledge; information industries are the most important sectors of the economy; and communication

⁶² It must be noted that Mosco's interpretation is consistent with traditional Marxian political economy in that it starts with class as the principle relationship of social life. Gender, race and social movements are seen as being constituted through class, and in turn these social groupings serve to mutually constitute class relations. (See Mosco, forthcoming: c.6-p.45)

technologies are the primary media of social interaction.⁶³ It is the latter notion that applies most directly to this analysis of MSS.

Characterizations of this current phase of capitalist development as an information society take several forms. Notable are Bell's (1973) conception of "post-industrial society", Drucker's (1993) "post-capitalist society", and Toffler's (1981) "third wave society". All of these notions rely heavily on a form of technological determinism: society is being fundamentally changed through the agency of information technology. The role of telecommunications, whether foregrounded or not, is key to the functioning of the information society, for it is through this technology that information is transferred and spatial distance is overcome. We now find the notion of "information superhighways" becoming prevalent, with great consideration given to how the telecommunications infrastructure will play a large part in delivering a new world of information services to our homes, schools and places of work. There is great concern that many will be without access to "information superhighways", and MSS is seen as an important link, particularly for rural areas and the developing world (Robinson et.al., 1993; Daggatt, 1995; Slack, 1995). These concerns often find themselves expressed through reference to the principle of universal access, a principle that has historically been central to telecommunications policy and regulation in Western, industrial societies. Upon closer investigation, however, we find that current notions of what constitutes universal service differ substantially from historical definitions, definitions that have served to centralize social policy concerns with respect to telecommunications provision.

⁶³ Webster (1995), in his discussion of theories of the information society, highlights five analytical definitions of such a society present in current literature: technological, economic, occupational, spatial, and cultural. These analytical divisions are used by Webster to question the veracity of the very notion of information society: "One can scarcely have confidence in a concept when its defenders diagnose it in different ways." (Webster, 1995: 29)

MSS, Access and Universal Service

When considering telecommunications and the social relations of hegemony, the notion of universal service is an excellent place to begin. The question of access is fundamentally political, and represents an important structural feature through which individual and social actors exercise their information-age agency. It is an issue that when taken broadly, encompasses concerns such as policy, privacy, and competence. It can also be said that the telecommunicative environment one has access to, and therefore makes use of, becomes in essence naturalized: one's common sense, taken for granted reality.⁶⁴ Often with those who celebrate the implicit democracy of the information society, this question of access is also taken for granted. There is little differentiation made between the forms of telecommunications one has access to, the cost of access, one's ability to make effective use of such technologies, and perhaps most importantly, the location of control within the telecommunication system. Historically, access has been mediated through government policies of universal service.

As stated earlier, the term "universal service" is generally attributed to Theodore Vail, the first general manager of the American Telephone & Telegraph Company (AT&T). It symbolized Vail's vision, and before him the dreams of the telephone's inventor Alexander Graham Bell, of a communications network widely available to all those who wanted it. Yet this early vision did not

⁶⁴ This metaphor can be extended to cover myriad features of today's telematic environment. Consider varying computer operating systems such as Windows-95, UNIX or Macintosh, which can literally be said to offer different operating environments. Whether one uses a 386 or much-faster Pentium personal computer, or the speed of the modem one uses to "surf the Internet" creates a familiarity, and expectation, regarding computing speed. A pager, cellular phone, or voice-mail message system that one can utilize from any phone enables one to "remain in touch", albeit to different degrees, when one is on the move.

mean that the telephone was a democratic technology intended for everyone. Vail was more concerned with creating a standardized network, which would allow for interconnection between geographically separated local telephone exchanges:

Quickly learning from the ongoing and often frustrating experiences of the franchisees in trying to accommodate a jungle of different standards, he saw the necessity for a single system under a single standard. With the assistance of technicians dispatched to the franchisees to oversee interconnection, Vail embarked on the construction of toll circuits or long-lines. To Vail, at this time, "universal service" was the interconnection of these local exchanges. "Universal" implied "everywhere" rather than "everyone." (Dordick, 1991: 112)

The earliest definitions of universal service can be considered as fundamentally geographic in nature, underscored by the desire to extend the long-distance calling market to all areas in North America already served by telephone. Vail was not very concerned with, or likely even cognizant of the idea that telephony could become an important medium of social communication. His concern was primarily with establishing its importance with respect to business users. It was not until much later that this vision of "universal service" was to apply to people.⁶⁵

The decision to extend the conception of "universal service" to include all people in society, as opposed to simple geographical availability, was one that in many ways was forced onto AT&T. By 1912, the company was faced with mounting suspicions on behalf of the U.S. government due to its aggressive merger and acquisition activities, and discriminatory interconnection policies. AT&T was seeking to gain monopoly control of the rapidly expanding telephone network, and sought to either buy out independent providers or, if that failed,

⁶⁵ It must be noted that Alexander Graham Bell did envision this type of "universal service" quite early. He foresaw telephone service as a sort of public utility, with a network similar to that of the gas and water systems (see Dordick, 1991: 110; Hadden, 1991: 62). "Universal service" as a stated goal of AT&T did not appear until 1910 (see Hadden, 1991: 62-3).

refuse to connect them to their network, thus literally cutting them off from long-distance telecommunication.⁶⁶ This latter practice effectively rendered the service offered by these independent providers undesirable, particularly in the eyes of business, due to its limited geographic scope. By 1913, the U.S. Justice Department had filed an anti-trust suit against the company, after which AT&T signed an agreement that mandated interconnection with independent companies, and prevented AT&T from acquiring independents without specific Justice Department approval. (Dordick, 1991: 113) It was this agreement that, in fact, laid the foundation for the provision of universal service through a single, "universal" network. As Dordick (1991: 113) notes, "Interconnection was the open door for the AT&T monopoly and for the provision of universal service, which was simply the interconnection for the delivery of a single service, the dial tone for the transmission of voice communications, or what has become known as 'plain old telephone service.'"

Important to consider are the political underpinnings of this policy, a policy which was later to be incorporated into the U.S. *Communications Act* of 1934. The compromise essentially guaranteed AT&T a monopoly in long distance telephony, while requiring the company to provide a public service at reasonable rates. As Sterling (1995*) points out:

AT&T ... willingly submit to federal regulation, but in return, it ... use[d] the government's regulators as its own police, who would keep out competitors and assure the Bell system's profits and preeminence.

This was the second birth -- the political birth -- of the American telephone system.

This arrangement was fundamentally political, for the compromise was meant to fulfill an essentially social policy - the provision of a *public utility* to all citizens -

⁶⁶ Vail's vision here can perhaps be characterized as predatory, envisaging "universal service" through a "universal company."

through reliance on a single, albeit private, network supplier. The provision of such utilities - electricity, roads, and often broadcasting are prime examples - has historically been the purview of government, and in the case of European states telephony remained so, through state-owned Post, Telegraph, and Telephone companies (PTTs). In the United States and many parts of Canada, this network provision was made by private companies. Interconnection ensured that while some appendages might be independent, the network backbone would in the United States be controlled by AT&T, and in Canada be owned by Bell.

Many consequences stemmed from this arrangement. First and foremost was the almost naturalized belief in telephony as constituting a "natural monopoly." In other words, the only efficient way to provide consistent, affordable service was seen to be through a single network under uniform control.⁶⁷ Davies (1994: 20) points out that an alternative model to the "natural monopoly" did exist at the time of the latter's formation:

An alternative decentralised arrangement, composed of a federation of independent local monopolies, represented a viable alternative to a single national monopoly. The federated model was prevented not because it was inefficient, but because the finance needed to fund the independent long-distance network was blocked by AT&T and a consortium of bankers. Under different historical circumstances the federated structure could have provided an efficient form of organisation.

Policies of universal service can perhaps be considered as the social trade-off that helped to legitimate the idea of the "natural monopoly." We are left to ask whether having moved into an era with multiple ways of providing telecommunications - MSS as the present example - corporate telecommunication providers still see the need to maintain such a social contract.

⁶⁷ This consideration can also be seen to have informed later policies respecting cable television. Cable TV services in Canada and the U.S. are typically provided by a local monopoly franchise, often a large national firm with extensive operations. This arrangement sees cable firms submit to relatively high levels of regulation in exchange for guaranteed rates of return.

If the idea of the "natural monopoly" has collapsed, then why maintain its associated ideas of universal service? A further, and related consequence, particularly in North America, has been the telephone's ubiquity. Sterling (1995*) writes that, "The telephone has achieved a rare and exalted state for a technological artifact: it has become a *household object*. The telephone, like the clock, like pen and paper, like kitchen utensils and running water, has become a technology only visible by its absence." (emphasis in original) In essence, the North American common sense, taken-for-granted reality of universal and ubiquitous telephone service is fundamentally the product of an historically conditioned and contested political process.

These considerations can thus be said to have had a structuring effect on the social relations of telecommunications access. Dordick (1991: 116) states, "The provision of high-quality universal service became a corporate tradition at AT&T. For the public it was perceived as an entitlement, if not a right." Universal and affordable access to the means of telecommunications is, as Dordick points out, seen by many in society to be a right. Yet this "right" must not be viewed as an historically static one. Indeed, the service we take for granted today is qualitatively different from the service of the 1920s and 30s. Yet there are those who dispute the public's right to progressively higher levels of services. For example, Wilson (1995*) referring to the Internet, argues access is not really even useful for most people:

Just because I have a connection doesn't mean I know what to do with it or that it is useful to me. To some degree we are trying to manufacture a need -- a wonderful marketing invention! What is useful for a researcher is not necessarily so for an average citizen. Manufactured need will not suffice to motivate "real" people to connect, nor to maintain a long-term information market.
(Wilson, 1995*)

While Wilson's argument is an important one to consider, we must be careful to distinguish between the right to access, and the current usability of what we access. Wilson seems to be arguing against the notion of "universal service", due to its association with the marketing strategies of large telecommunications providers, and instead argues for ubiquitous service, thus letting need drive access policy rather than vice-versa. Yet his argument appears based on a limited notion of universal service, for it fails to consider its historically *social* underpinnings as an element of telecommunications policy. The utilization of the concept of universal service is also historically contingent, for it is in the process of policy formation and implementation that the principle of universal service finds itself continually contested and redefined. The claims of telecommunications providers must be seen as an attempt to redefine the concept of universal service in terms favorable to themselves. Rather than simply abandon the entire notion of universal service, we must foreground its contested and political nature. To use a crude cliché, we should be careful not to throw the baby out with the bath water.

Wilson's (1995*) point, however, about the notion of "universal service" becoming a marketing point is well taken. With respect to MSS, this has the result of reconstituting the notion of universal service in geographical terms somewhat similar to Vail's early considerations. Statements made by Teledesic chairperson Craig McCaw are illustrative of this:

Economic growth and human affairs have come to rely on good communications. Today, the costs to bring modern communications to poor and remote areas is so high that many of the world's people can't participate in our global community. *Universal service has always been central to this country's [the United States] telecommunications policy. There is an opportunity now to broaden this vision to include all of the world's citizens. Achieving that goal will require a broad cooperative effort. Through Teledesic, we hope to take a small step in that direction.* (cited in Teledesic Corp., 1994) (emphasis added)

McCaw's use of the term "universal service" evokes the history of American telecommunications, and thus the reality of extensive telephone penetration and utilization, while simultaneously emptying the term of its social and political connotations. Absent is any sense of the social, political and economic struggle that led to the adoption of such a policy, and the degree to which it has been contested by AT&T in the past and the so-called "Baby Bells" (i.e. American regional Bell operating companies) today. As such, McCaw's usage of the term "universal service" suggests an attempt, whether conscious or not, to fundamentally rearticulate the concept, and can be seen as a current development in the historically dynamic process of the social relations of telecommunications access. If we use Globalstar as another example, we see a satellite network which is to be centrally controlled, with local and regional partners, all of whom are private companies, who can be effectively characterized as franchisees. (Globalstar, 1996*) A network configuration such as this is technically exempt from any social oversight, due not only to its transcendence of national boundaries but to the private nature of the project's participants. Access is meted out by a globally operating network of firms which, in the lack of effective regulatory oversight, cannot be held to any social definition of universal service.

MSS, Communications Competence, and Meaningful Access

The importance of an historical contextualization of the notion of universal service is that it allows us to critically interrogate current usage of the term, and divine the assumptions upon which they are based. What we see is not so much the notion of competing hegemonies, but the rearticulation of an

arguably hegemonic notion, universal service. Telephony, and now to a degree computer communications, have become integral parts of the telecommunicative environment of many people. The ability to define the principles through which basic access to this space is considered places effective control in the hands of the service providers, and those who support the terms of access (i.e. those whom MSS is marketed to). We also see the emergence of myriad new services, available to those willing to pay a premium and, perhaps more importantly, those with the ability to make effective use of them. Another way of highlighting this point is through reference to Gandy's (1988) notion of "communications competence." Gandy is here making note of the limited ability of many in society to make *effective* use of communication and information technologies.

Because of the increasing commoditization and privatization of information, and because of mounting personal and social deficits, the poor, especially among black and ethnic minority groups, are largely unable to utilize information resources to improve the quality of their lives. This aspect of communications competence, the ability to understand the world so as to act to change it, is only one variable in the equation of inequality.

Market structured limits on conscious awareness are almost matched by similar limits on the ability of the poor to articulate their concerns and to present their demands effectively in the relevant policy centres. Racial and economic segregation appears to be heightening critical forms of social and cultural differentiation, making alliances within and across class lines all the more difficult. (Gandy, 1988: 109)

What is crucial here is a movement towards a consideration of *meaningful access*. Access has to be seen in terms of the abilities of an individual or social group's ability to exercise what Gandy would consider as "competent" agency; the ability to effectively, and hence meaningfully, utilize not only the available technologies, but also the social and political resources necessary to ensure that social issues are foregrounded when considering the technology.

The racial and economic (i.e. class) biases that lead Gandy to consider the issue of communications competence are clearly consistent with Mosco's utilization of structuration. Both class and race are seen as central entry points into the analysis of structuration (Mosco, forthcoming: Chap.6). When analyzing MSS, both types of biases do become apparent. For instance, the ability of Third World states to effectively present their concerns in international fora such as WARC '92 was short-circuited to a degree by the nature of the debate surrounding MSS. According to Mohan (1992: 6):

... the conference was concerned with issues of technological complexity not directly relevant to developing countries.... One can write that on the evidence of WARC '92 as it developed, Third World participation at the conference was marginal if not irrelevant. That they are even more and more becoming passengers when the structures of the future are being discussed and apportioned is going to be difficult for many to have to swallow. Yet that was the reality before WARC '92, it is even more so after.

In the 1970s, Third World concerns were, to a degree, effectively represented in UNESCO and the ITU. The recommendations of the MacBride and Maitland Commissions both foregrounded the interests of predominantly southern States with respect to equitable news and information flows, and increasing telephone densities, respectively. The former concerns have been largely relegated to the background by the emphasis on trade considerations and other processes of commodification. The latter issues are evidenced by the global debate surrounding MSS, a debate which has become increasingly highly specialized, exceedingly technical, and ultimately self-referential in nature.

Several general streams of debate surrounding MSS are readily apparent. Spectrum allocation has become the primary regulatory issue, strategic business partnerships are considered the only viable form of financial arrangement, and the perspectives of potential users emphasize global mobility. All of these dimensions fundamentally limit broadly conceived social input, for participation

is generally limited to those who are able to partake in the debate. In essence, we may speak of participants as being capable of exercising an extremely high degree of competence. Spectrum allocation is a highly complex and technical issue, with consideration given to often untested views on the efficiencies of one application versus another. But we must not forget that these debates are also highly political in nature, with states often attempting to further their strategic and economic interests through various spectrum use proposals. Intelsat itself can be seen in this light, with due consideration given to its use as a foreign policy instrument intended to further contain the Soviet Union. Smith also illustrates the importance of a high, and thus specialized and costly, degree of technical support for successful exercise of a delegation's interest. Referring to WARC '79, he notes:

The American delegation had a staff in Geneva of more than a hundred, compared with one or two from some of the smallest countries; ... with the use of massive computer expertise the US had mapped out a negotiating position covering the entire spectrum from 1 hertz to 387 gigahertz with a complex set of fallback positions. The delegation had also collected all known facts concerning the positions of other delegations.... The whole of this information could be held on-line and could be retrieved in a matter of moments. It provided the United States with a tremendous advantage over all of its rivals. (Smith, 1980: 115)

Competence can here be attributed to those effectively able to participate in debates such as these. One is only left to wonder if extensive use of MSS is made within the Third World, whether the usage profiles integral to the operation of MSS will perhaps add to the strategic advantage of subsequent American delegations.

With respect to strategic business alliances, competencies are limited by the necessity of maintaining a focus on profit margins as well as the overall organizational imperatives of capitalist enterprise. What has been understood in

the previous chapter as a phenomenon of spatialization can also be considered through the notion of competency. The structuring of organizational space does speak to issues such as access, participation and control. As we have seen, the privileging of corporate space has ramifications for state activities such as policy making and regulatory oversight of telecommunications. Accompanying notions of "deregulation" obfuscate the reality that often, more regulation is needed to manage competition. However, new regulations are typically far more technical in nature and often deal with ensuring so-called competition rather than social policies of universal service. These latter considerations have become an assumed feature of the benefits of market-based competition. One might argue that faith in the social benefits of an assumed to be free market in telecommunications services has become hegemonic in nature.

Business arrangements facilitating MSS can also be seen in terms of potential class and ethnic dimensions. As we have seen, MSS providers are partnering with firms from all parts of the globe, both for reasons of service provision and for systems engineering. Arguments made earlier about the privileging of corporate involvement can be directly interpreted as foregrounding social class considerations; this input privileges the private capital, and hence the agency of capital classes, at the expense of forms of class agency alternative to the interests of capital. However, it is perhaps a bit simplistic to view this as an either/or situation: it is not sufficient to see this as the interests of capital as expressed through the agency of transnational private enterprise versus the interests of citizens as expressed through the agency of the state. Indeed, it has been demonstrated in the chapters concerning commodification and spatialization that this relationship is far more dynamic and multiply determined. States do not simply reflect one or the other set of interests, but

embody the values of each to certain degrees at any given time. With respect to telecommunications development in the Third World, public interest considerations are often equated directly with the interests of local corporate providers. The relationships between the state and indigenous capital borders on the incestuous.

An excellent example of this relationship, and hence emphasis on class power with respect to telecommunications is provided by Sussman (1991a). In this discussion of the historical trends of Philippine communications development, Sussman draws explicit links between the often personal relationships between those in positions of governmental power and those in charge of indigenous corporate enterprise. Benefits here accrue primarily to those with the ability to draw on preexisting relationships. For instance, Sussman (1991a: 136-41) refers to the Philippine Long Distance Telephone Company (PDLT), a company that thrived under the Marcos regime, yet has remained powerful even after the "People Power" revolution that overthrew it, despite calls for the company's nationalization. A key factor here may well be that the company's management was controlled by the Cojuangco family, a family with close ties to the domestic land-owning oligarchy. The firm's president, Antonio Cojuangco, also happens to be the cousin of Corazon Aquino, the Philippines' first president after Marcos. This is not to suggest simple corruption, where politicians are "bought" by businesspeople. Sussman makes an important distinction between corruption and systemic factors, such as the interests of transnational capital and the existence of local elites, that allow such close state/corporate relationships to thrive.

Often, the utilization of strategic partnerships is justified as allowing for local participation. Local firms are seen as having a better understanding of local

markets, and have experience operating in specific areas and in dealing with local customers. Indeed, Globalstar strategy explicitly relies on the "marketing, operating and technical expertise [of strategic partners to]... enhance Globalstar's capabilities." (Globalstar, 1996*) Yet these arrangements will primarily allow the system provider to exploit selected markets, and indigenous involvement will likely be subservient to this goal. As noted in chapter three, the likely outcome with respect to state structure would be its characterization as "dependent-integrated." Referring specifically to strategic corporate arrangements, Sussman (1991a: 147) argues:

Joint ventures [between First World TNCs and Third World firms] have allowed some openings to local elite equity participation previously restricted to the core states, but the technical, financial, and political inequalities embodied in advanced technology are more likely to widen the economic gaps and the structural basis of dependency, cause greater social hardships, and further undermine the autonomy of the state.

Local interests, and their manifestation through state policy initiatives or even through the agency of indigenous capital, are thus subservient to the interests of transnational enterprises who effectively "set the stage" for the involvement of smaller, regional firms. It is no coincidence that Globalstar refers to their "selection" of strategic partners. It is also through this lens that we may best view the attempt of Iridium, as mentioned in the previous chapter, to solicit participation directly from governments.

This dimension of strategic alliances has the potential not only to exacerbate current class dynamics, but may also influence racial and biases as well. While ostensibly sharing the same aims as Sussman's (1991a;b) studies of Philippine communications - that being a desire to critically interrogate domestic ownership structures with an eye towards addressing social and economic biases - Lent's (1991) discussion of telematics development in Malaysia, while still

maintaining a traditional class focus, also points to ethnic biases as a potential feature structured into the government decision-making process. Economic development plans have been molded to further the interests of the Malay ethnic group, and have served as a rallying point for state legitimation. However, Lent goes on to note that the benefits of this economic development, despite the rhetoric, have been reaped primarily by those Malays already in positions of power and influence.

Another dimension of ethnic biases with respect to telecommunications services can be revealed by examining telephone penetration rates in developed countries. While most people have access to telephone service, this access is by no means truly "universal." Schement (1995*) notes, "The current telephone penetration rate per household [in the U.S.] is approximately 94%, [and is] generally regarded as evidence of the success of long-term universal service policy." Even so, Schement notes this figure translates to 5.8 million American homes and 15.3 million Americans without telephone service. When one examines this figure further, it reveals a telling story. Lack of telephone service in the U.S. affects certain groups in society disproportionately: low income households, Blacks and Hispanics, single mother households, the elderly, and rural Americans. Particularly disturbing is the fact that Black and Hispanic low income households are less likely to have phone service than white families with comparable incomes. (Schement, 1995*) Thus while MSS providers seek to justify themselves by referring to their technology's potential to globalize the notion of universal service, a more thoughtful approach would find itself grounded in the reality that many Americans are still without basic telephone service, and a high proportion of these people come from socially marginalized ethnic groups.

Issues such as these speak directly to the issue of communications competence. This notion, as we have seen, deals with the ability of individuals or social groups to make *effective and meaningful* use of communications. MSS, as a specific telecommunications technology and as a debate that often leads to utopian claims about the ability to deliver the information age to all on the planet is, in fact, a technology whose efficient use calls for a relatively high level of competency. As we have seen, intended users to a large degree include global business travelers. However, as was demonstrated in the previous chapter on spatialization, these users will likely be making use of the system at the behest of their employers. Thus we must ask who, in reality, are the intended users: the individual traveler or their corporate employer? While no doubt there will be some self-employed users, the majority of users will likely have MSS as a part of their corporate-ordained telecommunications setup. Basic decisions about the appropriateness of MSS, and control over the forms of its legitimate use, will remain firmly with the employer. Thus it can be argued that competency in this scenario lies not with the individual user, but with the user's employer.

One of the more fantastic claims of MSS is the ability to offer basic telephony to those in areas of the Third World without existing service. Often, this rhetoric is grounded in the assumptions of the beneficial nature of telecommunications for society as a whole. While this thought may pertain somewhat to our developed, industrial society, it is almost ludicrous to apply it to areas without existing telecommunications. The crucial question that must be asked is what are people who have never used telecommunications supposed to do with MSS? I do not mean to imply that they will have absolutely no use for MSS, but the use of telecommunications as a form of social communications is a phenomenon that is historically conditioned: it is not sufficient to simply assume

that simply because a technology is available that it will become an important medium of social interaction. Rather, beliefs such as these bear a striking resemblance to the modernizing principles of Lerner, Schramm and de Sola Pool in that they assume we can increase the level of social development simply by applying advanced communications technologies. In fact, we can effectively situate MSS within this long history of ethnocentric, Western communication theory, theory which often seizes upon the newest forms of electronic communication as being the saviors of backwards, undeveloped societies. In this respect, we must acknowledge that communications competency is not an ability that can either be assumed or imposed.

MSS, Surveillance, and Individuation

A final aspect of structuration that can be applied to the analysis of MSS is the concept of individuation. Mosco (forthcoming: Chap.6-p.53), borrowing from the work of Poulantzas, defines individuation as:

... the tendency of capitalism to transform collective categories and identities into individual ones, thereby diminishing the social power of class, gender, age and other forms of collective energy. The working class, women, and blacks are thereby reconstituted as individual subjects.

Key to my application of individuation is the notion of surveillance, and its application through the technology of MSS. For Giddens, individuation is a fundamental element of modern social organization (see Webster, 1995: 52-73). An ever more complex social organization necessitates the collection of ever more data on the constituent elements of that organization, namely individuals, in the name of coordination and control. Yet Giddens' focus lies primarily with the surveillance functions of the nation-state (his concurrent focus is on the

macro level of human social organization), and as such has limited usefulness here. However, the fundamental principle that complex organizations require detailed information in order to efficiently operate is of direct import: as we have seen, employers, for instance, will likely use the global tracking facilities of MSS to gain greater control over their geographically dispersed operations, and geographically dispersed employees.

This line of reasoning bears a strong similarity to arguments presented in the previous chapter; the only substantial difference is the primary process of analysis being applied (i.e. spatialization versus structuration). While the former foregrounds the spatial manifestations of control apparatuses, here we are not so much concerned with the transformation of spatial relations as with considerations of how this serves to alter social relationships within an organization. Sewell and Wilkinson (1992: 271) argue, for instance, that surveillance technologies within the workplace "are deliberately designed to such that discipline is established in a most efficient manner and the exercise of minute control is possible with a minimum of supervisors." It has already been demonstrated that MSS represents an emerging workplace surveillance technology: the workplace, however, being one that is spatially diffused.

Yet the workplace represents only one potential site of surveillance and individuation. Webster and Robins (1993: 250) extend Sewell and Wilkinson's argument, forwarding the idea that this workplace phenomenon is part of a wider historical trend: the movement from Taylorism to Social Taylorism:

Talk of delegation of responsibilities is subverted by surveillance mechanisms which provide the centralised forces with ever more power. For us this indicates the development of Social Taylorism: management of ever more aspects of social life which presume close monitoring as a requisite of action. And in an era of capitalist reconstruction – the emergence of neo-Fordism ... – this lays stress on an appeal to the individual employee, consumer or voter,

often in terms of empowerment and decentralisation of responsibilities, which s/he is more closely surveilled as a means of better exercising greater plan and control.

This notion of Social Taylorism offers an extremely useful lens through which to view MSS and telecommunications more generally. The chapter on commodification has argued that movements towards metered service represent just such a trend within telecommunications. Tracking data generated through the very use of MSS, while being useful to many corporate subscribers, will no doubt also be useful to the MSS service providers in generating user profiles and planning for further system upgrades. No doubt, much of this collection of data will be rationalized by the enhanced ability of MSS providers to provide ever increasing levels of custom services.

This chapter has dealt with the analysis of MSS through the third of Mosco's proposed political economic processes: structuration. The emphasis has been on illustrating the social relational aspects of telecommunications practice, specifically the potential of MSS to transform these practices. The primary purpose of this chapter has been to consider MSS within the wider social context of the emerging information society. This arguably hegemonic notion is itself rife with the traditional assumptions of capitalism, positing a democratic and egalitarian future for all through the use of advanced information and communication technologies. MSS is an important element of this utopian vision, with its backers celebrating the ability of this technology to bring the information age to all parts of the planet. Absent, however, is a clear understanding of how this technology will be used as well as a consideration of who will be using it. The elimination of geographical barriers to access must not be confused with the ability of people to make meaningful and effective use of telecommunications. Furthermore, what must not be left aside is the ability of *all* people to come together and define the social goals of communications.

Conclusion

Contrary to the claims of MSS providers and boosters, mobile satellite services do not represent a panacea of global telecommunications. Given the history and current conditions of global telecommunications, it is unlikely that in the short term these technological systems will become anything more than another medium enabling the global organizational flexibility of transnational corporate enterprise. This thesis has attempted to critically examine the prospects for MSS by situating the technology within the historical dynamics of global telecommunications. The substantive analysis has made use of a new framework for the political economy of communications proposed by Vincent Mosco. This methodology foregrounds the existence of three key processes of social life - commodification, spatialization and structuration - and it is these processes which have provided the main organizing features of this thesis. The understanding is that these processes are the primary dynamic features of the capitalist political economy, and hence social life under capitalism. It is the imperatives of this global capitalist system that are shaping the emergence of MSS, and will eventually determine to a large degree the conditions under which MSS will be used.

Much of this thesis is admittedly speculative. Systems such as Iridium, Teledesic, ICO or Globalstar are currently still in the planning or early implementation stages, and truly global MSS telecommunications of the particular nature being discussed here is still years away. Much remains to be decided, including many regulatory, financing and engineering issues. It even remains to be seen as to whether these extraordinarily complex technological systems will work efficiently, let alone live up to the service expectations of their supporters. However, these latter factors in themselves should not detract from the need to pursue a critical analysis of MSS. Indeed, as one commentator has

pointed out, the main issues are financial and regulatory, not technological, "Least of the worries is the technology, you can buy your way out of most problems." (No author, 1994) A more simplistic analysis might conclude that MSS providers may also be able to buy themselves out of the financial and regulatory problems as well.

While superficially attractive to critics and cynics alike, this assertion barely scratches the surface of the complexity of issues raised by MSS. Relationships here, while fundamentally conditioned by the imperatives of capital, must not be seen as simply the instrumental result of the crude exercise of financial and technological power. Rather, while foregrounding a central and often determinant role of capital, an emphasis on the processes that allow for the mutual constitution of such relationships speaks to the deeper, continual and often consensual transformations of social life. The relevance of Mosco's framework is that it allows one to view and analyze a technology such as MSS as part and parcel of these social processes, rather than as an instrumental object to be employed in a coercive manner. While this latter characterization is at times useful - and justifiable - it simply does not go far enough.

The first chapter introduced the technology of MSS, several of the major proposals, and attempted to describe some of the current debate surrounding the technology. The technology itself represents a dramatic departure from historical forms of satellite telecommunications. MSS systems utilize low Earth orbit (LEO) or medium Earth orbit (MEO) configurations, rather than traditional geosynchronous communications satellites, thus necessitating the use of satellite "constellations", or multiple satellites linked into a single network. Historical concerns with respect to the allocation of geosynchronous orbital slots, an issue of import to many Third World nations, are not applicable here. The primary

international regulatory issue is now spectrum allocation. This issue has already been decided in favor of the MSS providers at the World Administrative Radio Conference of 1992 (WARC '92) and the World Radio Conference of 1995 (WRC '95) in large part due to the intensive efforts of the United States, the nation primarily responsible for the technology's development (through the U.S. military's "Star Wars" program) and home to the transnational corporations wishing to establish these systems.

This chapter also explored the history of satellite telecommunications in an attempt to understand MSS in relation to historical trends within the industry. American policy has largely driven the agenda of international satellite communications in general. The primary motivational factors have been both strategic - the U.S. historically sought to use satellite technology as an element of a foreign policy intended to contain the Soviet Union - as well as economic. This latter impetus has, in a sense, had the most staying power: with the collapse of the Soviet Union, economic goals have assumed a leading role as explanatory factors when analyzing American satellite policy. Satellite services are seen as an increasingly important industry at the "cutting edge" of technological development, and as such should be supported by the state, particularly with respect to the exercise of American power in order to secure "fair" treatment for MSS by other states. This position is reflected in much of the literature that pertains directly to MSS. We also find substantial references to the beneficial aspects of MSS for economic development and modernization, the regulatory hurdles facing the implementation of these systems at a global level, and industry literature dealing with the activities of industry players. These foci are not surprising when one looks at the history of traditional American

international communications theory, and its emphases on modernization and development.

The second chapter began with a brief overview of the theoretical literature that informs much of the discussion surrounding MSS. This was done to provide a theoretical backdrop for understanding the material celebrating technology, as well as to provide a context for the justification of the need for critical analysis of MSS. Traditional international communications theory, variously characterized as modernization or development theory, assumes the importance, if not outright necessity of advanced communications technologies as an aspect of social, cultural and economic development. Grounded in the work of scholars such as Wilbur Schramm, Daniel Lerner and Ithiel de Sola Pool, development theory is rooted in the Western ethnocentrism and American triumphalism which heralded post-W.W.II American society as the apex of human social development. Pluralism and democracy were taken as unquestioned characteristics of American life, and American society was forwarded as the model to which all nations should aspire. Absent, of course, was any critical understanding of domestic American social relations as being conditioned by the non-democratic and non-pluralistic tendencies of American capitalism. Also relegated to a non-issue was the U.S.'s involvement in the Cold War, and the role of American strategic imperatives in the application of development theory. It is clearly not surprising that the *direct* role of these scholars in research programs sponsored by U.S. military and intelligence agencies, something that Simpson (1993; 1994) so effectively illustrates, is ignored.

While much of this early American theory deals primarily with broadcasting and the mass media, it has proven itself quite resilient. In fact,

application to telecommunications and information technologies has breathed new life into a theory which even Wilbur Schramm began to question near the end of his life. (Keever, 1991) Whereas the level of social development was once thought to be indicated by the level of mass communications available throughout society (see Lerner, 1960), development is now seen as being contingent upon access to advanced telecommunications facilities. Sussman (1991a) notes that if this characterization were accurate, the Philippines would represent an excellent model of a developed society. Often this new strain of modernization theory argues in favour of deregulation as the necessary road to the fulfillment of a technology's potential, and presents unsubstantiated utopian visions of a non-hierarchical and egalitarian society as evidence of the desirability of these technologies. Theory such as this effectively legitimates the claims of MSS providers for access and utilization by providing a fixed and favourable set of assumptions from which to proceed towards what basically amounts to the exploitation of new markets.

The chapter then proceeded to sketch several theoretical perspectives offering the potential for a viable critique of MSS. Both dependency theory and traditional political economy analysis were explored, but it was argued that both are somewhat lacking in their comprehensiveness and as such were considered unsuitable for use as the primary theoretical framework of this thesis. Dependency theory, while offering a forceful critique of the dependent relations forced upon Third World states by capitalist development initiatives, nevertheless focuses too much on state-to-state relations, ignoring the internal class dimensions of Third World states and how this fits into the equation of uneven communications development. Traditional political economy critiques suffer from an overtly institutional focus and an inability to account for issues of

structural formation and social practice despite the foregrounding of conceptions of social class. The framework proposed by Vincent Mosco (forthcoming) and outlined at the outset of this conclusion not only addresses many of these theoretical shortcomings, but also offers a useful and effective map of the field of political economy of communication from which to engage in critical analysis. As noted earlier, the three processes of commodification, spatialization and structuration provide the organizing principle for the remainder of the thesis.

The central process of the political economy of communication as proposed by Mosco is that of commodification. Analysis of this feature of social life under capitalism grounds a large body of critical analyses of communication, and finds forceful application to the realm of telecommunications in general, and MSS in particular. Essentially concerned with the transformation of use values into exchange values, the process foregrounds the extension of market relations into areas of social life previously free from capitalism. This includes both areas not subject to market relations, what Mosco (forthcoming) refers to as extensive commodification, and the creation of new forms of commodities within areas of social life already subject to the market imperatives, a phenomenon characterized by Mosco as intensive commodification. Telecommunications, while to a degree existing in a commodified form since its invention and patenting, has been shaped to a large degree by social and political concerns and thus the use value of telecommunications has been embodied, for instance, in policies of universal service. However, the recent articulation of telecommunications in terms of trade in services and the importance ascribed it by Western, industrial states, notably the U.S., in international trade fora such as the General Agreement on Tariffs and Trade (GATT) and the General Agreement

in Trade in Services (GATS), points to a circumvention of social issues pertaining to telecommunications, and hence its deepening commodification.

It is historical development of this process that has primarily made a space, if you will, for the development and implementation of MSS. These systems are, for the most part, private organizations whose services will be under no formal social obligations and will be subject to nothing more than the imperatives of the market. The advent of MSS can also be considered an impetus to further commodification of telecommunications. The system being established by ICO was initially a project of Inmarsat, the International Maritime Satellite Organization, a treaty-based organization whose members are state-sanctioned entities. However, Inmarsat decided to spin off ICO into a private company, in order to make the project available to private investors and likely to blunt criticism for other MSS operators that Inmarsat enjoys a privileged position with respect to market access, taxation and the ability to draw upon the resources of member states. Inmarsat, and its quasi-parent organization Intelsat, are both organizations that have historically included the interests of nation-states, and thus can be said to nominally incorporate social considerations of telecommunications. While the degree to which this occurs is itself subject to debate (see, for instance, H. Schiller, 1992), it can be reasonably argued that these institutions are more responsive to social interests than fully private transnational corporations. The emphasis on the private provision of MSS, the spin off of ICO, and the structural transformations of both Inmarsat and Intelsat, ostensibly to make these organizations more responsive to a market with a growing degree of competitors, clearly illustrate the process of extensive commodification at work within the sphere of satellite telecommunications.

Intensive commodification can be seen in the use of MSS to create what are referred to by Mosco as cybernetic commodities, salable information created through the use of the technology itself. Tracking and position location data are two obvious examples of cybernetic commodities created through the use of MSS. It may also be possible to apply the notion of intensive commodification to the analysis of the state. Being the primary site of contestation between those desiring policies in favor of commodified and those calling for non-commodified principles, we can see movements by the state to more fully embrace principles of commodification as evidence. The retreat of social and governmental oversight of telecommunications, and the increasing belief that the private sector provides the only legitimate force for economic and social development is clearly evidenced in discussions of MSS. In effect, what we are witnessing is the application of development theory coupled with a state internalizing a commodified value system.

Chapter four addressed the process of spatialization. Referring to the transformation of spatial and temporal relations through capitalism, this process is central to the critical analysis of MSS. This particular technology represents a truly global telecommunications system, with the capability of transcending all of the spatial limitations of traditional forms of telecommunications. While this is often touted as a way of bringing telephone service to parts of the globe previously without physical access to the means of telecommunications, this global vision no doubt represents an idealization of the capacity of the technology. We are subsequently inundated with utopian visions of an end to organizational hierarchies, due to the elimination of space as a constraining feature of organization and the placing of knowledge-gathering technologies in the hands of all. These notions are grounded in a belief in the inevitability of

organizational decentralization, a concept which is crudely deterministic, divested of any sense of power, and ignorant of the control functions necessary to all forms of bureaucratic organization.

A far more down to earth (excuse the pun) scenario will likely see MSS become a means through which corporations will be able to exercise flexibility over the spatial organization of operations. MSS as a tool of a wider telecommunications strategy creates the potential for a reconfigured centralization, whereby operations, control functions and power relationships are diffused spatially, yet still reflect a sense of hierarchical organization. MSS will likely heighten the need for control of informational flows within an organization and thus increase the power of management. This may well translate into a reinforcement of the "global city" phenomenon. Large cities, already attractive as sites for informational coordination, are likely to maintain this attraction. Despite the ability to provide telecommunications services to anywhere on the planet, MSS will in no way supplant existing forms of telecommunications. Rather, use of MSS may well result in a heightened need for access to terrestrial telecommunications in order to effectively integrate MSS communication into a firm's informational flows. We are also left to wonder whether MSS will serve to structurally marginalize rural areas with respect to the accessibility of telecommunications services: why should terrestrial capacity be added when MSS serves those most able to pay for service?

A helpful means of considering spatialization is to use Massey's (1992: 1993) concept of power-geometries. This notion involves examining the spatial manifestations of power relations, and how they are constituted out of the various relationships at play. This concept is indeed quite a malleable one; it can be applied to a particular organization, state, international organization, or other

space that sees the interaction and mutual constitution of relationships. Space is seen as being created out of the interplay between these various actors, and is considered fundamentally dynamic. Global telecommunications can, for instance, be considered as a particular power-geometry. Here we see the interests of private MSS providers as being in unison, creating a space for the private provision of MSS. The transformation of this power-geometry can thus be partly attributed to the process of commodification. The insinuation of commodified relations into the consideration of telecommunications fundamentally transforms this particular power-geometry by privileging the role of private capital. The corporate sphere itself can also be characterized as a power-geometry, where the converging and diverging interests of MSS providers and their strategic partners play themselves out. The exercising of what Mosco (1993: 25) refers to as "flexible forms of corporate power" – strategic alliances, joint ventures, etc. – can be thus viewed as a transformative practice, both with respect to inter-corporate power-geometries and those of individual MSS projects. Arrangements such as these are fundamental to the structuring of MSS providers, creating a sense of hierarchy and power between those firms cooperating on a particular project. Another dimension of spatialization pertains to the role of the state, and its constitutive role with respect to telecommunications. Here we see how state activities serve to make space for the private provision of telecommunications in general, and MSS in particular. In essence, we are speaking of a phenomenon analogous to the commodification of the state, although here we are considering it in relation to its spatial ramifications.

The final substantive chapter involved the analysis of MSS through the process of structuration. Incorporating the principle of the mutual constitution of structure and agency, this chapter began with an analysis of MSS and its relation

to the hegemony of the information age. Its main goal was to contextualize the debate surrounding MSS within the wider sphere of social thought and practice. It is necessary to interrogate the transformation of capitalist society in order to effectively situate the particular technology of MSS. Often we see allusions to the information society; they appear in the mass media as well as academic writing. They have come to symbolize not only our new collective future, but the demise of socialism as a viable alternative to capitalism. As with the modernization theory and the notions of the demise of hierarchy explored in the spatialization chapter, mainstream considerations of the information society are often grounded in a crude technological determinism and an unquestioned belief in the pluralist and democratic nature of liberal capitalist society. It is assumed that access to the "information superhighways" of the future will be guaranteed; MSS is to provide access to rural areas and much of the developing world.

The question of access is perhaps the most crucial issue dealt with in this thesis. In a sense, it provides the theme which unifies the entire argument. Access cannot be seen simply as a geographical concept, a notion that is implicit in much of the literature dealing with MSS. Such notions are akin to the understanding of the spatial implications of MSS without a consideration of the power relations inherent within global capitalist society. We must also never forget that access, and the particular notion of universal service, is a historically conditioned feature of telecommunications. It is a politically contested and historically socially focused principle of Western telecommunications policy. Even so, social considerations of universal service are constantly under attack, and these important dimensions are obfuscated if not completely ignored in current debates surrounding MSS. What must be foregrounded is the notion of *meaningful access*. This idea finds partial expression in Gandy's (1988) notion of

communications competence. Access to the means of communications, MSS as the current example, is meaningless if the power to define the terms of debate is in private hands. Commodification as an historical trend in telecommunications works against just such an exercise of meaningful access. Effective social use of MSS calls for the rearticulation of the values implicit in the design and implementation of the technology. Global mobile satellite services offer the *technical* potential to deliver telecommunications to every place on the planet. Despite this fantastic physical capability it is unlikely that in its current configuration this service will become an important and meaningful form of social communication. The imperatives of global capitalism will likely mean that MSS will become just another means by which large-scale capitalist enterprise will be able to exercise flexibility.

The preceding summary has reviewed many of the critical issues pertaining to the implementation of MSS explored in this thesis. These issues are fundamentally social, and the conclusions reached point to a need to rethink the capitalist foundations of global telecommunications. Critical political economy, as this thesis has attempted to demonstrate, provides an effective theoretical lens through which to critically view new communications technologies such as MSS. Mosco's new framework has provided an effective guide by which this investigation has been conducted. Analyses such as this are an important antidote to the myth-making of the information society, and its uncritical celebration of socially important technology such as MSS.

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