International Organizations to Enable World-wide Mobile Satellite Services

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ABSTRACT

Numbers of systems exist or have been proposed to provide world-wide mobile satellite services ("MSS"). Developers of these systems have formulated institutional structures they consider most appropriate for profitable delivery of these services. MSS systems provide niche services and complement traditional telecommunications networks; they are not integrated into world-wide networks. To be successful, MSS system operators must be able to provide an integrated suite of services to support the increasing globalization, interconnectivity and mobility of business.

The critical issue to enabling "universal roaming" is securing authority to provide MSS in all of the nations of the world. Such authority must be secured in the context of evolving trends in international telecommunications, and must specifically address issues of standardization, regulation and organization. Today, only one existing organization has such world-wide authority. The question is how proponents of new MSS systems and services can gain similar authority. Securing the appropriate authorizations requires that these new organizations reflect the objectives of the nations in which services are to be delivered.

INTRODUCTION

An earlier paper addressed some of the institutional, political and cultural issues related to the provision of world-wide MSS. It postulated an international organizational form responsive to the criteria to be met to enable "universal roaming." [1] That paper argued that such an international organization must simultaneously respond to traditional business incentives, as well as respect the national sovereignty and objectives of the countries within which services are to be delivered.

The earlier paper proposed an international organization with two parallel elements. One was a traditional commercial corporation which would build, launch and operate MSS systems. The second was a parliament of delegates from each served nation whose main function was to franchise the distributors of MSS services, thereby responding to the unique needs of each country to be served. That paper, however, did not address how to evolve from the existing, proposed and as yet unannounced MSS systems to world-wide system(s) which provide truly universal service.

"Universal roaming" in the context in which it is generally used today means having a single telephone number by which a user may be reached independent of geographic location. Services implicit in this context are

narrowband voice and data. Over time, however, "universal roaming" will undoubtedly come to mean bandwidth on demand for a variety of services, both mobile-to-mobile and mobile-to-networks. Further, the user will have available a single, light weight terminal easily capable of establishing the most efficient connection for the type of service demanded, independent of carrier or MSS system.

This paper continues the earlier discussion and examines additional institutional, political and cultural issues related to the world-wide provision of MSS.

THE WORLD OF MSS TODAY

A number of MSS systems exist or are proposed to provide a variety of services; most are focused on niche markets. Likewise, system operators and proponents have adopted or espouse a variety of organizational forms for delivery of these services world-wide, and on a regional basis.

Global Systems

Inmarsat

The International Maritime Satellite Organization ("INMARSAT") is today the only operational world-wide MSS provider. It provides maritime and land mobile narrowband voice and data services via a number of satellites in geosynchronous orbit ("GEO") to terminals as small as suitcases. It is experimenting with the provision of aeronautical services, and plans to introduce handheld services in the near future.

INMARSAT is a "not for profit" consortium of member states ("parties") created by treaty. Services are provided in the member nations by designated "signatories" to the treaty, usually the nation's Post, Telephone and Telegraph ("PTT"). Revenues are shared between INMARSAT and the signatories based on each's equity

interest and revenue generated. Because of its structure, INMARSAT has "landing rights," the right to provide services, in virtually every country in the world.

Marathon

Russia has provided MSS, termed "Volna," using cross-strapped transponders on its GEO Gorizont satellites. It has established a new program called "Marathon" for the provision of commercial MSS, to include voice, telegraph, facsimile and high quality data channels.

The Marathon system will comprise now being developed Arkos satellites in GEO, three or four, and Mayak satellites, two to four, in a highly elliptical Molniya orbit.

Marathon, a commercially based inter-governmental organization, plans to make its spare capacity available on an undetermined basis to organizations outside the Commonwealth of Independent States ("CIS").

The Big LEOs

Motorola ("Iridium"), TRW ("Odyssey"), Loral/Qualcomm ("GlobalStar"), Ellipsat ("Ellipso") and Constellation Communications, Inc. ("Aries") all plan low earth orbit ("LEO") constellations to provide narrowband voice and data services to handheld user terminals world-wide. Several of these system proponents have offered equity participation in themselves to PTTs and private organizations throughout the world in return for cash investment and the right to provide services in the investor nation. They have argued that by investing in the service provider, a nation becomes a participant in the delivery of services and gains a claim to dividends from profitable operation of the system in proportion to the amount of investment and the amount of traffic generated by the investor nation. It is not clear, however, that any of these proponents have

secured landing rights in most nations of the world, much less world-wide.

The Little LEOs

Orbcomm, StarSys and VITA have proposed LEO constellations to provide data and messaging services world-wide. Several of these organizations have successfully negotiated contracts with in-country local entities to provide services in numbers of nations. As with the Big LEOs, world-wide landing rights have not been secured. In this case the world-wide MSS operator is acting as a wholesaler of capacity to traditional national service providers.

National and Regional MSS Systems

AMSC and TMI

American Mobile Satellite Corporation ("AMSC") in the United States and Telesat Mobile, Inc. ("TMI") in Canada have jointly designed regional MSS systems for North America. AMSC and TMI are both investor owned private companies that plan to offer narrowband voice and data services directly to users with fixed and mobile terminals.

Other Systems

Several proposals and systems other than those identified here have been advanced for national and regional MSS systems, including Australia's Optus and Mexico's L-band payload on Solidaridad. For the most part the system proponents are established national and regional telecommunications service providers seeking to expand their franchises through the provision of MSS. While sometimes proposing dedicated organizations to provide MSS, they are based on existing national and regional institutional relationships with their concomitant operating authority.

INTERNATIONAL TRENDS IN TELECOMMUNICATIONS

While MSS systems present unique issues which must be addressed, they are and will continue to be influenced by evolving international trends in the delivery of telecommunications services.

Businesses rely extensively on telecommunications services to coordinate operations in increasingly disperse geographic locations. Businesses demand new, sophisticated, reliable, world-wide services; they seek global interconnectivity, interoperability, and mobility. Further, as businesses focus on their core activities, they increasingly consider ownership and control of telecommunications networks as non-strategic, and look to global carriers to provide a full complement of services and to guarantee service level, quality and price.

Technologies and services are converging to create intelligent value-added networks offering varieties of services. Bandwidth, formerly a limiting factor, is becoming a commodity.

As a consequence, competition has become globalized as established system operators look for techniques and relationships to enable them to continue to serve their existing clients' needs world-wide. Traditional operating companies are being restructured in response to deregulation. The investment required to both modernize traditional telecommunications networks and to extend their reach into newly emerging centers of economic activity is fostering innovative regional arrangements among national service providers.

Today's MSS systems, existing and proposed, provide niche services to complement traditional telecommunications networks; they are not integrated into these world-wide networks. However, excellence in a niche market alone is insufficient for long-term survival. The niche operator has no direct control over the elements determining

the overall quality and reliability of end-to-end world-wide MSS. Thus, for long-term success MSS operators must establish relationships with other telecommunications service providers to provide an integrated suite of services.

CHALLENGES TO WORLD-WIDE MSS SYSTEM OPERATORS

With the exception of INMARSAT, MSS system operators are today not organized to provide world-wide services. To reach the objective of world-wide MSS, system operators face three sets of challenges: standardization, regulation and organization.

Standardization

International standardization has been a significant catalyst in the development of world-wide telecommunications systems. Standardization has fostered market competition while helping focus research and development on enhanced services and capabilities. A lack of standards leads to inefficiency in the delivery of telecommunications services and fragmented markets, both of which impact operators' ability to finance systems.

Timing in the formulation of standards is of critical importance because of the enormous cost of research and development. Manufacturers want to take early advantage of the availability of new services to establish a market share for their products. If standards are delayed, manufacturers are often forced to adapt their early products to conform to standards which evolve later, a cost which no one wants to bear.

Global compatibility of systems enhances customer choice of equipment, services, and suppliers; fosters greater competition among manufacturers and service providers; ensures larger production runs of terminal equipment which results in lower costs from economies of scale.

Established operators such as INMARSAT have defined their markets and services, and competitive manufacturers have responded to INMARSAT's de facto standards which are global. AMSC and TMI have jointly defined standards for their regional MSS systems. The other system advocates have proposed a variety of technical approaches to the provision of their services, all with implicit standards. While these "proprietary" standards serve the interests of their proponents, they do not facilitate global interoperability or interconnectivity.

Regulation

Regulation of MSS operators must be examined in the context of the dynamic tension between the pace of technological change and the need for stability of regulatory scheme.

International MSS spectrum issues were addressed at the 1992 World Administrative Radio Conference ("WARC"). Virtually all system operators and proponents argue that inadequate spectrum has been allocated to MSS. Nonetheless, very little of the allocated spectrum is in use today, and, consequently, regulators world-wide have little actual market data against which to judge the adequacy of the allocated spectrum. Further, technological advances may diminish the perceived need for additional spectrum.

Regulation by national authorities is, perhaps, the most significant challenge to world-wide MSS providers. In most nations the telecommunications service provider is the government-owned PTT. Even when it does not hold a full monopoly, the PTT controls its nation's radio frequencies, thus also controlling its competitors' operations. This structure defines the conditions under which an operator can provide MSS in the nation.

More progressive nations are taking steps to privatize their telecommunications systems, or otherwise allow some form of domestic competition. In spite of this trend,

most governments maintain a high degree of control over telecommunications service providers and vigorously protect their national enterprises. MSS providers must regard these privatized enterprises as national entities similar to the PTT. To be authorized to provide services in a particular nation, MSS providers must make favorable arrangements with each government, its PTT and any other entities designated by the government. If they do not, they will not be allowed to provide services in that nation.

Organization

Deregulation of national telecommunications system operators inherently favors new entrants and the introduction of innovative services, first in international and then in national markets, an advantage to be exploited by would be world-wide MSS service providers.

It has been suggested that the world-wide provision of MSS is truly a new kind of business that needs a new way of doing business. Because MSS systems are literally able to reach almost everyone in the world, their operators must have authority to serve their subscribers in every country to provide "universal roaming." To be successful, the world-wide MSS system operators must overcome each country's differing politics, culture and customs to structure relationships with each country to allow provision of services there.

Traditional multinational companies reflect the goals and culture of their founders and operators. They are tied to their countries of origin. Shareholders and managers of these companies are economically incentivized, and fear loss of control. They do not necessarily successfully accommodate national needs. Consortia are more like governments; they provide an effective forum for addressing multiple and often divergent objectives and cultures, but are operationally bureaucratic and cumbersome.

The organization of existing international telecommunications service providers and operators has followed the traditional theory of manufacturing and is based on economies of scale and/or scope. These theories advocate horizontal integration of organization, that is, large organizations with world-wide operations.

However, there are costs associated with the use of market mechanisms to develop these organizations: search costs to find appropriate strategic partners; costs to formulate, negotiate and formalize the institutional structure of the organization to be created; for monitoring and supervising the delivery of services and the functioning of the new organization; for adapting the organization to new technologic and market challenges. These transaction costs are mainly arguments for vertical integration of MSS service providers. [2]

It can be argued that world-wide MSS providers should be organized to take advantage of the strengths of small organizations: agility, easier access to management, high quality services, and the ability to offer customized business applications. World-wide MSS system operators require organizations which efficiently and cost effectively deliver services, and simultaneously respond to the individual requirements of the countries in which the services are provided.

INTERNATIONAL ORGANIZATIONS TO ENABLE WORLDWIDE MOBILE SATELLITE SERVICES

The question is how to evolve organizations to provide world-wide MSS that meet the above objectives. Arguably, the issue of spectrum is resolved for the foreseeable future. In addition, issues of standardization may be resolved by default via established operators such as INMARSAT, soon to be operators such as AMSC and TMI, and the negotiated rulemakings currently being

sponsored by the Federal Communications Commission ("FCC") for both Big LEO and Little LEO proponents. Therefore, the question remaining is one of organization, including the relationship between the service provider and the various nations in which services are to be offered.

The issue is fundamentally one of economics. The U.S. Department of Commerce estimates that MSS revenues will reach $300 million by 1993. "Revenues are projected to soar by the mid-1990s with the introduction of even more sophisticated services and the launch of satellites dedicated solely to mobile communications." [3] The Department of Commerce further estimated that in 1992 there were thirteen million MSS users world-wide.

Notwithstanding the glowing projections for world-wide MSS, it is doubtful that the total market can support the existing and currently proposed systems. And, there are even more systems on the drawing board.

The question is how to efficiently select the systems and operators to provide world-wide MSS that will be successful. Free market advocates argue that the most efficient decision process is the market, and that competing system proponents should get their systems financed, secure landing rights throughout the world, build and launch systems, deliver services, and thereby demonstrate economic success.

However, economic theory demonstrates that competition works well with private goods such as manufactured products, but that a pure market economy has difficulty with public goods such as infrastructure and with goods that have external effects such as MSS.

There are numbers of approaches to addressing this question, each with its own advantages and disadvantages.

First, the charters of existing international and regional telecommunications service providers can be expanded to encompass world-wide MSS services. The

most logical existing organization for this expanded world-wide charter is INMARSAT. Regionally, existing satellite system operators may wish to extend their franchises through appropriate agreements.

Second, a joint venture could be created between INMARSAT and one or more of the system proponents to provide the full spectrum of services proposed to be offered. It is reasonable to assume that all of the system proponents have approached INMARSAT about such relationships.

Third, a new treaty organization could be created specifically to provide world-wide MSS. Not likely.

Fourth, an independent international authority such as the International Telecommunications Union ("ITU") could be given the authority to determine standards for world-wide MSS. Once the standards were established, with full participation by system proponents, then all operators wishing to provide service could negotiate their best deals to gain access to as much of the world's population as possible.

REFERENCES

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[2]   See, Prof. Dr. Klaus Spremann, "What is the Optimal Number of Competing Telecom Companies?" *Business Guide to Switzerland*, no. 1, pp. 11-13, February/March 1993.

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