INTERNATIONAL TELECOMMUNICATION UNION
TELECOMMUNICATION DEVELOPMENT BUREAU

WORLD TELECOMMUNICATION DEVELOPMENT CONFERENCE (WTDC-98)

Valletta, Malta, 23 March - 1 April 1998

Document 162-E
25 March 1998
Original: English only

For information

Agenda item: 3.1 **COMMITTEE B**

Director, BDT

REPORT ON THE OPINION 5 GROUP OF EXPERTS

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I. INTRODUCTION

On 21-23 October 1996, the first ITU World Telecommunication Policy Forum ("WTPF") was held in Geneva, Switzerland. At the WTPF, 833 delegates representing 128 Member States and 70 Sector Members came together to discuss and exchange views and information on the policy and regulatory issues raised by the introduction of global mobile personal communications systems by satellite ("GMPCS").[1] At this historic occasion, five opinions were adopted. This Report is the direct result of the activities undertaken pursuant to Opinion 5 of the WTPF.

Opinion 5, entitled "Implementation of GMPCS in Developing Countries," invited the Director of the ITU's Telecommunication Development Bureau (BDT) to establish a Group of Experts. This Group was given the task of preparing a Checklist of Factors which developing countries may take into account in the process of introducing GMPCS services. It also was assigned the task of advising and assisting, in response to the concerns and the needs of the developing countries, on the technical and regulatory issues associated with the introduction of GMPCS, and to study the policy and socio-economic impacts of GMPCS services in developing countries. For further details on Opinion 5, please refer to **Annex 1**.

It should be underscored that activities noted in Opinion 5 are inclusive provisions for articulating concerns of and programmes for developing countries consistent with Opinion 2, Principle 2, of the WTPF, namely, fostering participation of developing countries in GMPCS through partnership and assistance.

In the 14 months following the WTPF, the Group of Experts carried out its assigned tasks. At the outset, the following checklist of factors was developed ("Checklist of Factors") in order to be of assistance to national regulators when defining, within their national regulatory regime, their position in relation to GMPCS systems in general or when negotiating with a given GMPCS systems operator:

1) Universal service: role of a GMPCS system in the provision of universal service.

2) Affordable prices: what parameters should be taken into account for:
   - prices of proposed services to be considered as being at a level to make the services as widely utilized as possible,
   - costs that affect the affordability of the service such as:
     – interconnection charges
     – reasonable transit charges, if applicable
     – other government charges.

3) Global service and roaming availability: the extent to which the introduction of a given GMPCS will permit a world-wide or regional use and roaming, as well as dual operation (space and terrestrial use).

4) Matters relating to the MoU:
   - take account of the results of the MoU on type approval, certification, mutual recognition, provision of access to traffic data

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[1] GMPCS has been defined to include "Any satellite system (i.e., fixed or mobile, broadband or narrow-band, global or regional, geostationary or non-geostationary, existing or planned) providing telecommunications services directly to end users from a constellation of satellites." That definition is applied throughout this Report.

- ensure that the GMPCS system operator is signatory of the MoU.

5) Interconnection matters: Are there technical and/or operational limitations that would prevent interconnection, and what steps must be taken to resolve them?

6) Numbering: What steps must be taken to implement the internationally agreed numbering scheme for GMPCS systems?

7) On the basis of Principle 4 contained in Opinion 2, relating to a transparent and non-discriminatory licensing process and taking account of:

– the license/authorization delivered by the ITU Member to the GMPCS operator for the space segment,

– the coordination agreements reached in respect to the system under consideration,

– the frequency spectrum availability

– any transitional arrangements, if any, for the use of frequencies with respect to existing and planned services,

– the probability of interference cases,

– the need to comply with all applicable domestic and international rules,

consider matters relating to licensing and to any related licensing fees, for:

- user terminal
- gateways
- service providers.

8) Consider the extent to which a system can prevent and/or identify unauthorized uses, means for identifying them, their impact on PSTN and other telecommunication service providers, and the resulting loss of revenue for the operators concerned.

9) Consider the impact of the operation of GMPCS systems on existing telecommunication networks and services and on their revenues.

10) Consider competition matters between GMPCS systems and existing telecommunication networks and services and between GMPCS systems and ensure that no anti-competitive action is taken by any of them.

11) Consider the extent to which GMPCS system operators offer opportunities to participate in ownership.

12) Consider the extent to which GMPCS systems are able to provide for privacy and security of communications.

13) Consider the extent to which the GMPCS system is responsive to communications requirements in cases of emergency.

14) Ability of the GMPCS operator to provide locally transfer of know-how on technical, operational and managerial matters.

15) The overall benefit that may be derived from the introduction of GMPCS.

In addition and based on contributions from various sources, including valuable inputs obtained during the five regional GMPCS Workshops - conducted between July and October 1997[2] - and on discussions by members of the Group of Experts, it was possible to conclude all tasks assigned to the Group of Experts and to produce the results in this Report ("Report"), which is intended to be submitted by the BDT Director to the 1998 World Telecommunication Development Conference ("WTDC"), pursuant to Opinion 5.

GMPCS: BACKGROUND

There are four global activities that have influenced the development of GMPCS:

- The ITU World Radio Conferences (WARC-92, WRC-95, WRC-97);
- The WTPF;
- The development of the GMPCS Memorandum of Understanding ("MoU") and its Arrangements; and
- The World Trade Organization ("WTO") Agreement on Basic Telecommunications Services ("WTO Agreement").

These activities are summarized as follows:

The ITU World Radio Conferences (WARC-92, WRC-95, WRC-97)

ITU World Radio Conferences are convened on a regular basis to address frequency allocations and regulatory provisions associated with the use of spectrum and orbital resources. In the 1992, 1995, and 1997 Conferences, decisions were taken on frequency allocations and associated radio regulations that enable all types of GMPCS projects/systems to progress.

The First WTPF

The first ITU WTPF, mentioned above, was a historic event, at which Member States and Sector members considered the policy and regulatory issues raised by GMPCS and adopted five opinions:

- Opinion 1: The Role of GMPCS in the Globalization of Telecommunications;
- Opinion 2: The Shared Vision and Principles of GMPCS;
- Opinion 3: Essential Studies by the ITU to Facilitate the Introduction of GMPCS;
- Opinion 4: Establishment of MoU to Facilitate the Free Circulation of GMPCS; and
- Opinion 5: Implementation of GMPCS in Developing Countries

The five opinions are summarized in **Annex 2** hereto. As noted above, this Report is one of the products of the work carried out under Opinion 5.

The development of the GMPCS MoU and Arrangements

Subsequent to the WTPF, as requested by WTPF Opinion 4, Member States and Sector members have worked together to finalize and adopt a GMPCS MoU and associated Arrangements. (**See Annex 3**). The GMPCS MoU and Arrangements address issues of type approval and marking of

[2] Workshops were held in: Damascus, Syria; Manila, Philippines; Arusha, Tanzania; Mexico City, Mexico; and Kiev, Ukraine.

GMPCS user terminals, licensing and transborder movement of GMPCS user terminals, customs, and access to traffic data.

The WTO Agreement[3]

On February 15, 1997, the WTO successfully concluded nearly three years of negotiations on market access for basic telecommunications services (including satellite services). A total of 69 WTO Member countries made commitments in the WTO Agreement, which will be annexed to the Fourth Protocol of the General Agreement on Trade in Services ("GATS"). The results of the WTO Agreement are to be extended to all WTO Member States on a non-discriminatory basis through Most Favoured Nation ("MFN") treatment. At the time this Report was prepared, the WTO Agreement had not yet entered into force but was scheduled to come into force in early 1998. Once in force, the schedules will constitute part of the GATS schedules of services commitments already in force since 1994. In a number of schedules, a Member's commitments for particular services are phased in. For these, the schedule will formally enter into force on the date the Agreement as a whole enters into force, but the actual implementation date for such commitments will be the date specified in the commitments.

GMPCS: GLOBALIZATION

The development of GMPCS should be seen in the broader context of globalization. The world is undergoing fundamental changes in the sense that almost all economic activities are reaching beyond the national borders of one's own country. Trade barriers in goods and services are being reduced in many parts of the world. The movement of people across borders for business, recreation, and social purposes is becoming more common. Satellite technology ensures that communications services will be responsive to these changes and this globalization trend.

Satellite technology offers other benefits as well. In many developing countries, telephone densities are still at a relatively low level in the cities and in the non-urban areas. According to the latest ITU statistics, the low-income developing countries had only 1.95 main telephone lines per 100 inhabitants (1995 figure). In 1995, there were on average 8.54 lines per hundred inhabitants in urban areas but only 0.89 per hundred in rural areas in low-income developing countries. The cost to upgrade such facilities through conventional wireline or terrestrial means is prohibitive for much of the world. It is therefore necessary for the developing countries to boost the urban as well as non-urban penetration of basic telecommunication services in order to benefit from globalization. The globalization process involves capital flows and investments in resource sectors as well as in the services sector, which includes transportation, telecommunications and finance. Satellite technology, with its instant ubiquitous coverage, may offer cost-effective solutions for developing countries.

Satellite technology, such as GMPCS and Very Small Aperture Terminals (VSATs), has also allowed for greater global mobility. Some of the new GMPCS systems have entered the field of satellite communications, which for the past 15 years has been occupied predominantly by Intergovernmental Satellite Organizations. In recent years, a growing number of private entities have been prepared to develop and invest in satellite technology. At the same time, satellite terminals have become smaller and cheaper.

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[3] The second ITU World Telecommunication Policy Forum, to be held March 16-18, 1998, will examine trade in telecommunications services, including the recent WTO Agreement.

Satellite technology continues to advance. Some satellite systems, including many of the GMPCS systems now being developed, are the initiative of private sectors. This implies that there should be changes in policy, particularly in countries that do not foresee sufficient private participation in the telecommunication sectors, to allow these systems to thrive and to realize their potential.

The Players

Seven categories of players in the GMPCS community can be identified:

1. National Regulatory Authorities. The international community recognizes each country's sovereign right to regulate its telecommunications. This Authority acts in the name of and on behalf of States. It is the responsibility of the NRA, according to its national laws and policies, to grant the appropriate authorizations to allow GMPCS services in a country.
2. GMPCS system operators. These are the owners/operators of the space segment. They have assumed all the financial, technical and commercial risks to develop a GMPCS system and seek harmonization of procedures governing the provision of GMPCS services in order to avoid a proliferation of administrative impediments liable to constrain the development of the market.
3. GMPCS gateway operators. Gateways are the earth station link between the space segment, consisting of satellites in orbit (geostationary or non-geostationary), and terrestrial networks, which are the main sources from which GMPCS terminal traffic is drawn. Depending on the business structure of the GMPCS system, the earth station, in some cases, can be considered as a part of the space segment, and be managed by the GMPCS system (satellite network) operator. Gateways are often equipped with Mobile Switching Centres (MSC), Home Location Registers (HLR), and a Visitor Location Register (VLR).
4. Public Switched Telephone Network ("PSTN") operators. PSTN operators are the traditional operators which provide most of the telecommunication services and networks (both wired and wireless) in a country. Furthermore, they are indispensable partners for interconnection with terrestrial networks.
5. Local and/or Regional Service providers. Local service providers are responsible for the local or regional provision of GMPCS services. Their activities may include identifying and managing subscribers, marketing GMPCS services, distributing GMPCS terminals, and billing GMPCS customers. A GMPCS system operator or GMPCS gateway operator could also be a local or regional service provider.
6. GMPCS terminal manufacturers: These are the companies that manufacture terminals for specific GMPCS systems.
7. GMPCS terminal users. These are the customers whom all the other players are called upon to serve. They should receive good quality service at the best possible price, within the strict confines of the laws and regulations of the host countries.

II. REGULATORY AND POLICY ISSUES

LIBERALIZING TRENDS IN TELECOMMUNICATIONS

The following six primary factors are prodding governments in many countries to reform regulatory environments and liberalize telecommunications sectors including GMPCS: (1) the importance of liberalization has been proven repeatedly; (2) multilateral funding institutions attach increasingly stiff reform conditions to foreign aid; (3) financing and export credits from vendors and countries are diminishing, forcing governments to turn to the private sector - both national and international - for investment; (4) traditional public telecommunication operators (PTOs) cannot meet the increasing demand for services; (5) governments are recognizing the opportunities for technology transfer brought about by liberalization; and (6) customers are cognizant of the benefits of competitive offerings both on price and on technological development.

Liberalizing trends have been enhanced by the WTO Agreement, mentioned above, which has been estimated to encompass about 90 percent of the world's telecommunications services revenues. The Agreement marked a major shift in telecommunications policy around the world, such that trade policy is now driving regulatory reform in many of the participating countries, both developed and developing. It is also expected to provide another major boost for satellite services, including GMPCS. In the WTO Agreement, market access commitments on satellite services were made by 56 countries. In practice, the potential advantages of global mobility or portability to be provided by GMPCS can be maximized by implementing the regulatory and policy principles contained in the WTO Agreement.

This chapter will focus on key policy and regulatory issues, recognizing that GMPCS poses various challenges not only to the relevant operators and prospective users but also to government regulators, including:

- how to safeguard national sovereignty and security;
- how to ensure fair competition among a number of GMPCS systems and their service providers;
- how to authorize GMPCS services including use of the applicable frequencies and user terminals (mobile and portable ones);
- how to optimize the technical capability of GMPCS (e.g., global coverage to urban, rural, remote, and unserved areas) while supplementing the resources devoted to universal service obligations in the developing countries.

NATIONAL SOVEREIGNTY AND SECURITY

GMPCS systems can provide global or regional coverage. This capability has raised questions about national sovereignty and security. Generally speaking, communications networks must comply with national regulations that govern sovereignty and assistance to law enforcement and security agencies. These typically have requirements for national routing, location determination and legal interception. Big LEO systems, broadband systems and, in some cases, other systems, have the technological capability to allow for location determination and call monitoring.[4] This will enable governments to ensure that their national sovereignty and security are respected, especially where unauthorized use is concerned.

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[4] It is anticipated that in the future all GMPCS systems will feature this capability.

Some governments and telecommunications operators are concerned about the potential for bypass - by GMPCS systems operators - of their existing telecommunications infrastructures. It is important to keep in mind that GMPCS is neither intended to replace existing networks nor is it feasible, at a technical level, for it to do so. GMPCS systems are designed to complement and augment the existing telecommunications infrastructures: GMPCS tends to be used where there are limited or no other alternatives.

While there may be some diversion of revenue from a country's service provider(s) when travellers and local users make calls on a GMPCS system, it is anticipated that there will be an accompanying rise in the overall volume of calls over a country's network. This is because increased access to service leads to greater consumption of that service. The increase in information flows will also stimulate the economy of the country, which will in turn increase the tax base for the government. Ultimately, most countries should recognize that they can benefit from access to GMPCS through improvement in the quality of life of the population, an influx of investment, and participation in the ownership and operations of GMPCS facilities and services.

Despite the differences in their system architectures, the GMPCS system operators and service providers recognize the above concerns about national sovereignty and security, and believe they are addressing those concerns in their:

- *technical functionality,* such as national routing, location determination, legal interception, and system designs to prevent users from any unauthorized use;
- *technical capability,* which will allow GMPCS services to complement rather than replace the existing telecommunications infrastructures; and
- *service provision,* which will generally be offered together and/or jointly with the local partners and/or service providers who are under the jurisdiction of National Regulatory Authorities.

FAIR COMPETITION

The GATS and the WTO Agreement have facilitated "progressive liberalization", including principles of transparency, non-discrimination, and competitive regulatory environments. Among the principles underlying the GATS is that of MFN *treatment* which prohibits WTO Member countries from discriminating among themselves or from treating other members less favourably than they would treat any other country. Other regulatory principles contained in the Reference Paper, included in the WTO Agreement, which was adopted in whole or in part by most countries participating in the basic telecommunications negotiations, address issues such as competitive safeguards, interconnection guidelines and conditions, universal service, public availability, licensing criteria, impartial regulation and objective, timely, transparent and non-discriminatory allocation and use of scarce resources. In the event that WTO Members do not comply with their commitments, including their commitments concerning these regulatory principles, appropriate dispute settlement procedures are available. For more details on this Reference Paper, please refer to **Annex 4** attached.

Similar principles on fair competition were adopted earlier in the WTPF Opinion 2. In particular, Principle 3 of Opinion 2 provides:

- "within the limits of spectrum availability and the framework of their national telecommunications policy, national policy-makers should consider maximizing competition in the provision of GMPCS services;" and

- "GMPCS system operators and service providers should not discriminate among different countries or categories of users except where this is justified by specific technical or economic considerations."

Because there are or will be many entities providing GMPCS, ensuring open and fair competition is of paramount importance. In order to foster open and fair competition in progressively privatizing and liberalizing telecommunications sectors, National Regulatory Authorities are encouraged to provide the GMPCS industry with fair, transparent, and non-discriminatory terms and conditions, taking into account the principles adopted in the WTO Agreement and the Opinions adopted in the WTPF.

LICENSING POLICY

Traditionally, licensing has been one of the policy instruments for regulating technological expansion and ensuring competition in the telecommunications sector. However, no unified global policy on licensing criteria exists thus far. This is true for GMPCS as well.

The recent developments in international fora have created the conditions that enable regulators and policy-makers to introduce GMPCS. Many national governments have now committed to make public those laws, rules, and regulations (including licensing criteria) that affect trade in services, including GMPCS. The WTPF's work also included a set of voluntary principles, to create a simplified, non-discriminatory, and transparent regulatory environment for service licensing, earth station authorization, interconnection arrangements, and user terminals to introduce GMPCS.

Nonetheless, many National Regulatory Authorities may face various challenges from the advent of GMPCS systems at national levels: which GMPCS systems should be licensed; whether there should be a limit to the number of licences; if so, how many systems should be licensed; how should licences be granted and so on.

Although GMPCS opens up new dimensions of regulatory requirements, simplified licensing can be implemented in accordance with segment approaches, such as space, ground, and user segments, in addition to the service provision, as follows:

Space segment: Satellites

The space segment (i.e., satellites) licences for non-governmental satellite systems are granted by the GMPCS operator's notifying Administration, which submits the appropriate notification of the GMPCS system to the ITU in accordance with the Radio Regulations. This creates an effective way of balancing the needs of governments to monitor and manage the use of the radio spectrum, and the needs of GMPCS and other satellite operators to get spectrum assignments and succeed in the coordination of their systems.

Ground segment: Earth stations

The ground segment refers to the network of gateways. Gateway earth stations link one or more terrestrial networks and the satellites. The ground segment licences are granted by the countries in which gateways are located. Most GMPCS systems have or will have such ground facilities in a number of countries depending upon each system's design. In many cases, it will be the local gateway earth station operators who apply for the applicable authorizations or licences from the National Regulatory Authorities.

User segment: GMPCS terminals

GMPCS user terminals can vary from handheld mobile, portable to fixed installations (e.g., village telephones, computers, etc.), for which the licensing requirements may differ. Mobile and/or portable GMPCS terminals require a global regime so that they can be used and carried anywhere. Given that GMPCS systems are offering, or intend to offer, regional and/or global services, creating a requirement for individual licences for terminals is detrimental to unfettered circulation and use. Therefore, the detailed Arrangements associated with the GMPCS Memorandum of Understanding, developed as a result of WTPF's Opinion 4, provide for a simple regime for the licensing, circulation, and use of GMPCS terminals. These Arrangements encourage Administrations to:

- recognize the licences for GMPCS terminals issued by other countries;
- exempt GMPCS terminals from requiring an individual licence for those terminals covered by blanket and/or class licences;
- permit visitors to carry their terminals even if use is not permitted.

The mobile and/or portable GMPCS terminals can be exempted from the requirement for individual licensing by means of a "blanket" or "class" licence. However, administrations may impose conditions which must be fulfilled before GMPCS terminals will be exempted from this requirement. Such conditions may include:

- type approval of the terminals to an agreed standard, marked with a certification mark, as appropriate;
- compliance with frequency use as set by the Administration;
- authorization of the service with which the terminal operates;
- protection of other services from harmful interference.

The method by which Administrations implement their National Regulations, or other relevant instruments specifying whether individual licences are required, can vary. Exempting terminals from individual licence when they are covered by blanket licence or a class licence is suitable for systems in which user terminals can be controlled by the network.

Service Provision

The licence held by a service provider will authorize it to operate transmission lines (wired or wireless) necessary for the provision of GMPCS services in the country which has issued the licence. This includes transmission lines which consist of the uplink from the satellite earth stations (ground segment) and/or the downlink (the connection from the space segment to the earth stations and/or the mobile/portable user terminals respectively). There should, however, be no restrictions to licensing the service provision whether the earth stations are located in the specific countries or not. The suggested minimum elements for a licence application in the adjoining box that can be issued by the Administrations will, if applied, ensure adequate treatment of these issues.

SUGGESTED ELEMENTS FOR A LICENCE APPLICATION FOR A SERVICE PROVIDER

General

1. Name and contact information of applicant (in the country)
2. Name of GMPCS System
3. Relationship of GMPCS System to applicant

Services

1. Types of GMPCS Services
2. Coverage of services in the country (roaming capability, rural and remote coverage, etc.)

Applicant

1. Describe the entity or type of entity, through which services will be provided in the country

System Description

1. Satellite constellation and orbital characteristics
2. Earth stations
3. User terminal(s)
4. Numbering plan and its implementation, if applicable
5. Frequency requirements (feeder and service links)
6. Interconnection between GMPCS and the PSTN

Implementation Plan

1. Implementation milestones
2. Launch contracts
3. Procurement contracts
4. Investor list

GMPCS MoU and Arrangements: Signatory

It is also necessary to determine whether scarcity of frequencies represents a constraint on the number of GMPCS services that can be provided in a country, to be shared among future systems. To be able to make frequencies available for GMPCS transmission lines, international and/or regional frequency harmonization is needed. *For this reason, a licence for the operation of transmission lines for GMPCS services may not include a guarantee with regard to the use of frequencies.* It may, indeed, require a two-step process (granting of a licence *and* assignment of the frequencies). The degree to which international and/or regional frequency harmonization has been

achieved by the time a licence is granted will have to be taken into consideration. The granting of licences and frequencies is done in the context and exercise of sovereign rights of the individual countries.

The advantages of global mobility can be maximized by understanding some of the general regulatory and policy issues involved in licensing a GMPCS service. What follows is an overview of several issues that are being raised by government regulators, operators, and prospective users mainly in the developing countries.

INTERCONNECTION

One of the issues identified in the Checklist of Factors is interconnection - specifically, "Are there technical and/or operational limitations that would prevent interconnection, and what steps must be taken to resolve them?"

The interconnection of telecommunications networks benefits the customer in a multi-operator and competitive environment. Some regulators enforce interconnection terms and conditions to a legal standard, while others may stipulate a maximum negotiating time between parties, after which, if no agreement is reached, the regulatory body can establish provisional terms and conditions.

Regulators should aim to establish a rule or a principle, by means of which GMPCS system operators and service providers have open, equal, fair, transparent, and non-discriminatory access to the networks in each country at cost-based rates. The regulator should require interconnection to be equal in type, quality, and price to that provided by the dominant carrier to itself or its subsidiaries: e.g., its mobile telephone affiliate.

In sum, the more the telecommunications environment becomes populated by competitors, the greater will be demands on national regulators to ensure reasonable, fair, transparent, non-discriminatory and cost-based terms and conditions. However, actual interconnection negotiations and arrangements should be made on a commercial basis between the relevant operators, the local GMPCS service providers and/or gateway operators.

SPECTRUM AVAILABILITY AND MANAGEMENT

The ITU Radio Regulations govern the use of spectrum by individual governments. This provides a guarantee of effective spectrum management and protects existing services from unacceptable interference. The Reference Paper to the WTO Agreement also addresses spectrum allocations.

Deployment of GMPCS service requires enormous capital investments and demands long periods for development. Therefore, as with other aspects of licensing policy, spectrum allocation should be done without placing financial burdens on operators that will inhibit the deployment of their service.

Moreover, any procedures for the allocation and use of scarce resources, including frequencies, should be carried out in an objective, timely, transparent and non-discriminatory manner. The current state of allocated frequency bands should be made publicly available, but detailed identification of frequencies allocated for government use is not necessary.

FEES AND TARIFFS

Any fee associated with the required licences will inevitably be reflected in the cost to local and world-wide customers of GMPCS services. Therefore, policy decisions relating to licensing fees for frequencies, use of terminals, service provision, universal service funding or any other fee or charge must be evaluated carefully to avoid potentially undesirable consequences and must be carefully evaluated.

In a commercial or competitive environment in which new entities are free to develop or provide a service, suitably rebalanced, cost-based tariffs (customer prices) will result. The GMPCS system operators and service providers, as private commercial entities, are likely to set tariffs according to their costs, and in response to competitive market conditions. By contrast, it is stated by many developing countries that *affordable* rates are necessary to achieve universal service objectives.

In order to be able to provide services at affordable tariffs in the context of universal service objectives for many developing countries, some GMPCS service providers may offer different or special tariff packages with various elements (e.g., local, international, handheld mobile, fixed village or community phones). The introduction of special rates for local communications inside a country (if the system design does not foresee a local gateway in each country, the costs for local communication will have to take routing agreements into account) or for community telecommunications centres, may be a remedy to this problem. All in all, any fee or charge associated with the required licences will inevitably be reflected in increased charges to local and world-wide users.

UNIVERSAL SERVICE

Another factor identified in the Checklist of Factors is "Universal service: role of a GMPCS system in the provision of universal service." The issue of universal service provision is, indeed, a fundamental concern and objective in most developing countries. However, there is a need to differentiate between "universal service" and "regional or global coverage". Many, not all, regional and global GMPCS systems have technical capabilities to offer their services anywhere in the world or anywhere in the relevant regions. However, it does not mean that they are technically capable of providing "universal service" as defined by a particular country.

Here, it is important to clarify the role that GMPCS can and should play in the provision of universal service within each country. GMPCS services are "Regional and/or Global" in a sense that they can be technically provided everywhere in the region(s) or world. However, "universal service" has traditionally meant something different. Within a country's territory, it is often the case that a single government-owned or government-licensed incumbent operator has committed to provide service to all or nearly all the country's people. This is generally coupled with the ability to cross-subsidize services. This approach has relieved many governments from having to raise tax or other revenues to subsidize service for its citizens who cannot afford to have access to basic telecommunications services or live in very remote areas.

Universal service is also addressed in the Reference Paper in the WTO Agreement, which provides that:

"Any Member has the right to define the kind of universal service obligation it wishes to maintain. Such obligations will not be regarded as anti-competitive per se, provided they are administered in a transparent, non-discriminatory and competitively neutral manner and are not more burdensome than necessary for the kind of universal service defined by the Member."

GMPCS systems can provide basic voice and data services in many countries, the developing countries *inter alia*, that are currently underserved or even unserved by the existing service providers. But, if a country decides to authorize GMPCS services, it should not make the GMPCS operators or service providers fully responsible for achieving universal service goals.

III. TECHNICAL AND OPERATIONAL ISSUES

GMPCS SYSTEMS

GMPCS system is defined as "any satellite system (i.e. fixed or mobile, broadband or narrow-band, global or regional, geostationary or non-geostationary, existing or planned) providing telecommunication services directly to end users from a constellation of satellites", in accordance with the GMPCS-MoU.

However, there are several different types of the GMPCS systems e.g.:

1. Geostationary Mobile Satellite Services (GEO-MSS)
    - Global
    - Regional
2. Non-Geostationary Mobile Satellite Systems
    - Big LEOs (Narrowband GMPCS)
    - Little LEOs (Data only GMPCS)
3. Broadband Fixed Satellite Services (Broadband GMPCS)

The following table shows the characteristics of each of them.

Characteristics	**Data-only GMPCS**	**Narrowband GMPCS**	**GEO-MSS**	**Broadband GMPCS**
Known as….	Little LEO	Big-LEO	Narrow/Broadband MSS	Broadband-FSS
Services available	Data only	Voice and Data	Voice, data, video	Multimedia including voice and data
Terrestrial counterpart	Messaging services such as paging and mobile data	Cellular telephone	Cellular ISDN	Fibre
Bit rate	1.2-4.8 Kbit/s	About 9.6 kbit/s	2.4-144 Kbit/s	Up to 1.5 Gbit/s
Frequency range	Below 1 GHz	1 to 3 GHz	1.5-1.6 GHz and around 2 GHz	above 10 GHz
Type of service	Store-and-Forward	Real-time	Store-and-Forward Real-time	Real-time

In addition to the systems shown in this table, existing geostationary FSS systems can provide GMPCS applications to portable terminals.

Relationships between GMPCS players and the topics they address

To function properly, the value-added chain requires that the players achieve a number of agreements and/or accept a minimum of rules. The following table indicates examples of the types of arrangements and issues that these players may have to address in order to implement GMPCS. This table is, however, only an indication of the various issues that should be addressed, and it should be noted that some of these issues are not applicable to all GMPCS systems, nor in conformity with applicable situations in each country.

Table 1: Relationships between the GMPCS Players

PLAYERS	National regulator	GMPCS network operator	GMPCS gateway operator	PSTN operator	Service provider	GMPCS terminal user	GMPCS manufacturer
	A	B	C	D	E	F	
National regulator	International coordination Regional coordination						
GMPCS network operator	Coverage authorization Agreement on frequency band Agreement on access to traffic data Agreement on the handling of unauthorized use of GMPCS terminals Compatibility with other radio infrastructures	Standardization and interoperability Frequency coordination					
GMPCS gateway operator	Landing right Frequency coordination (feeder link)	Operating agreements Technical coordination and qualification	None				
PSTN operator	Agreement on tariffs and technical conditions for interconnection Agreement on the regulation of technical problems	Agreement on the resolution of technical issues Numbering and routing plan Agreement on revenue sharing	Interconnection agreement Resolution of technical issues frequency coordination				
Service provider	Fair competition License for providing telecommunication service Import authorization Blanket or class license for terminals Authorization to use a visiting terminal	Operating agreement Interconnection agreement	Agreement on local tariffs	Interconnection agreement	Roaming agreements Coordination for type-approval and authorization of terminals		
GMPCS terminal user		Confidentiality and security of communications Protection against fraud	None	None	Subscription Billing and recovery	None	None
GMPCS manufacturer	Type approval of terminals	Contract for manufacturing	None	None	Contract for use	Use of terminal	None

Issues relating to spectrum coordination

The spectrum allocated for GMPCS is shared with a number of non-GMPCS telecommunication services. For a full description of the allocations of radio spectrum, see the relevant Radio Regulations Articles in the Final Acts of WRC.

The successful coordination by an Administration licensing global and/or regional GMPCS systems shall not in any way imply licensing authorization to provide a service within the territory of a Member. These Administrations licensing GMPCS systems and stations intended to provide public personal communications by means of fixed, mobile or transportable terminals, shall ensure, when licensing these systems and stations, that they can be operated only from the territory or territories of Administrations having authorized such service and stations in compliance with relevant ITU Radio Regulations. Furthermore, cooperation and coordination between GMPCS network operators are required in order to ensure equitable use of the frequency bands assigned to the services, so as to safeguard the quality of the products offered and to promote competition.

The use of certain frequency bands by GMPCS systems and other telecommunication services could cause interference to terrestrial networks. GMPCS system operators will avoid harmful interference through frequency coordination and other mitigation techniques. In view of the fact that LEO systems operate at variable azimuths and elevation angles, the gateway operator, in cooperation with the GMPCS satellite network operator, must ensure throughout the coordination process that the frequencies used do not cause interference to other radio network users beyond levels accepted in the Radio Regulations. For GMPCS systems using geostationary satellites, the coordination principles and relevant Radio Regulation Articles now in force should continue to apply.

Access to traffic data

Consistent with applicable national legislation in the country where GMPCS service has been authorized, and recognizing technical differences between systems existing and planned, GMPCS system operators or service providers will provide to Administrations and/or Competent Authorities implementing the GMPCS-MoU and its Arrangements, on a confidential basis, within a reasonable period of time to any authorized national authority which so requests, agreed GMPCS traffic data originating in or routed to its national territory; and will assist with measures intended to identify unauthorized traffic flows.

In particular, the conditions governing the entry, use and carriage of visiting terminals should comply with national regulations, which could be facilitated by the Memorandum of Understanding in Opinion 4 and implementation of the arrangement..

Unauthorized uses and users of terminals

GMPCS system operators should take the necessary steps in their system design to prevent unauthorized uses and users. The Big LEO systems and Broadband LEO systems have been designed to be able to detect the location of a subscriber and prevent that subscriber from gaining access to the system in territories where the service has not been authorized.

Standards and Interoperability

GMPCS system operators must continue to work together and with ITU-T and the ITU-R to develop necessary requirements in order to ensure adherence to essential technical requirements. GMPCS operators should endeavour to secure interoperability with other systems.

Numbering and Routing

The ITU allocates international dialling codes for countries, geographic areas, and global services. To facilitate the implementation of GMPCS networks, the ITU assigned country code "881" for Global Mobile Satellite Systems (GMSS). Different Big LEO GMSS operators will share this code, and they will be identified by the digit following "881." To date, the ten different digits following the "881" country code are:

0 - ICO

1 - ICO

2 - Odyssey

3 - Odyssey

4 - Spare

5 - Spare

6 - Iridium

7 - Iridium

8 - Globalstar

9 - Globalstar

To reach a GMPCS subscriber using these numbers, a PSTN caller must dial the local international prefix, the code 881, the digit identifying the network, and finally the subscriber's number. GMSS systems will use the country code 881. These allocations and other numbering systems will enable GMPCS subscribers to be reached anywhere in the world through one number. In some scenarios, customers of terrestrial wireless networks can be reached through their national cellular number.

In order to provide for easy routing of traffic to the Big LEO GMPCS systems, each country will have to include the country code 881 in its routing tables. This numbering plan complies with existing ITU-T Recommendations on numbering and digit analysis (E. 164 and E. 162), and should not require upgrades to the international transit centre (ITC) switches. GMPCS service providers will provide guidance to PSTN operators indicating how to route and bill traffic to their networks.

In their traffic relations with GMPCS, PSTN operators should adopt international accounting procedures (for the fictitious country with the code "881") and adopt transit rates which are as low as possible. In particular, countries having a gateway on their territory must make additional efforts to ensure that the cumulative price of the different segments is not dissuasive.

Decisions have already been taken within the ITU-T to continue the study of making country code resources available to broadband and regional GMPCS systems. Some GMPCS operators may choose to assign numbers from locally available number pools instead of, or in addition to, these global numbers.

Confidentiality & Security

The user of a GMPCS terminal must be protected against any interception, tapping or unauthorized access to the information carried in his communications, subject to national laws.

For many of the GMPCS systems, protection of personal privacy and security from the unauthorized release of data about an individual subscriber is provided at the same level of protection supplied in terrestrial GSM networks. Inherent in the GMPCS system design is a

provision for user data protection. One method protects the identity of the user by using a temporary identity. This prevents the association of intercepted data with a particular subscriber. Other methods may also be used to protect user data. Many of the GMPCS systems have taken steps, such as implementing a complex authentication process, to minimize fraud and protect their customers from others who attempt to use the customer's identity. The ITU-T is studying methods for protecting confidentiality.

GMPCS system operators should provide the necessary capabilities regarding security of communications. In particular, the user of a GMPCS terminal must be protected against fraud.

Terminal type approval and marking

Type approval, identification and authorization of terminals are fundamental features for smooth operation of GMPCS systems. Type-approval of terminals will be made much easier if national regulators, in cooperation with the other players involved in the provision of GMPCS services, apply relevant articles of GMPCS Opinion No. 4 and its arrangements.

OPERATIONAL ISSUES

Revenue sharing

One of the keys to the success of GMPCS system operations will lie in the international community's ability to agree on equitable sharing of revenues between concerned players. On the other hand, the players must endeavour to keep tariffs as low as possible for the benefit of the end user. The costs incurred in setting up a communication via GMPCS depend on how the communication is routed, according to the network architecture. Depending on the architecture and the business relations, the following entities can share in the revenue, for example: the Government, GMPCS operator, PSTN operator, gateway operator, and local service provider(s).

Local distribution of service

GMPCS services will typically be distributed within a country by a commercial legal entity established in the country under national law. The operating agreement between a GMPCS system operator and a service provider must comply with national regulations on the use of visiting terminals of the same system.*In particular, government charges, if applicable, may be examined by the regulator, in order to ensure fair competition between different systems operating in its country.*

Tariffs and technical conditions for interconnection

GMPCS systems do not anticipate or foresee any technical and/or operational limitations that would prevent interconnection. All of the Big LEO and GEO-MSS GMPCS systems will interconnect (some already do) to the PSTN networks to enable customers to communicate from their mobile terminals to PSTN customers and to enable PSTN customers to reach the GMPCS subscribers. Calling patterns for Big LEO and GEO-MSS GMPCS systems are expected to be similar to cellular calling patterns, where the vast majority of the calls are originated or terminated on the PSTN, with only a very small portion of traffic originating and terminating on a Big LEO or GEO-MSS GMPCS system. Therefore, the PSTN plays a significant role in the carriage and termination of traffic.

Little LEO GMPCS systems may rely on the PSTN to connect customers to the gateway earth stations and the gateway earth stations to connect to data destinations, such as the Internet. In general, GMPCS system operators will need to work with the various PSTN operators to establish the proper routing of calls from the PSTN network to the satellite systems and the proper billing for

these calls. In addition, PSTN operators will work with the various GMPCS service providers and operators to develop interconnection arrangements. Such arrangements will vary depending on the design of the various systems and the location of their gateways.

Broadband LEO systems are designed to be a seamless extension of terrestrial networks. They will interconnect to the PSTN and data backbone (PSDN) to provide the "last kilometre" access link that constitutes the vast majority of network cost. That is where the largest unmet demand lies, and that is where these systems can provide the greatest value.

GMPCS gateway operators must, in line with national regulations, negotiate agreements on tariffs and technical conditions for interconnection and transit agreements with PSTN operators. All of the parties involved must endeavour to keep their cost components at the lowest possible levels, in particular for residential use of GMPCS.

Domestic usage of GMPCS

Although GMPCS service can be available anywhere at any time, the different architectures of systems bear different cost elements. The identification and the billing of such calls could require technical and/or operational agreements to lower those costs.

Government charges

In countries where government imposes taxes on GMPCS services to their home service provider(s), it is expected that similar taxes, where applicable, will be paid by visiting GMPCS subscribers through their GMPCS service provider(s), under the fair, transparent and non-discriminatory principles, and in accordance with the international accounting procedure described below.

International accounting procedures

The accounting between service providers of the same GMPCS network will be determined through normal business negotiations among the interested parties. GMPCS system operators will provide traffic data to their service providers to enable them to bill their customers.

The GMPCS system operator should provide traffic data on visiting terminals to both the home service provider and the appropriate visited service providers. Application of the method of exchanging accounts foreseen in the International Telecommunications Regulation, ITU, may be improved upon, since traffic data are collected exclusively by the GMPCS system operator.

The GMPCS system operator should provide traffic data on visiting terminals to both the home service provider and the appropriate visited supplier simultaneously; this would enable the home service provider to bill its subscriber for any government charges, where applicable, and the visited service provider to reclaim the charges from the home service provider.

IV. SOCIO-ECONOMIC IMPACTS OF GMPCS IMPLEMENTATION

ECONOMIC IMPACTS

Telecommunications networks are essential for social, economic, political, and cultural development in every country. Interconnection with international networks is also vital in an increasingly integrated and interdependent world.

Access to GMPCS can assist Administrations in achieving national objectives in education, health, urban/rural population distribution, universal service, disaster relief and international relations. GMPCS can contribute to the implementation of policies aimed at economic development and social stability.

Where widespread terrestrial networks are not available, such as in remote and rural areas, GMPCS systems may offer a means of providing basic telecommunications services.

These systems could also be an efficient way to achieve prompt and affordable national networks and integration into the global economy.

In examining the socio-economic impacts of GMPCS systems on developing countries, one has to take into account not only the benefits but also the possible difficulties coming from introduction of GMPCS. Evaluating these benefits and other potential impacts can help in establishing the safeguards that may be necessary to ensure all participants obtain the maximum possible benefits from GMPCS, even more efficiently than the imposition of regulatory barriers.

Universal service and universal access

The issues of universal access and service provision are a fundamental concern and need in most developing countries. The regulatory body should focus attention on the ways to implement universal service requirements from a legal perspective as well as the services covered, e.g., basic telephone service.

A dynamic and evolving definition

Universal service generally implies an obligation by the public telecommunications operator(s) to "provide all of the people within the country with convenient and fair telecommunications services". This obligation has traditionally been assumed by government-owned or licensed common carriers in exchange for a monopoly telecommunications franchise. Universal access generally signifies the availability of infrastructure enabling access to services.*The Missing Link*, the 1984 Report of the Independent Commission for World-wide Telecommunications Development (The "Maitland Commission") proclaims that "if appropriate actions are taken by both industrialized and developing countries, it will bring all mankind within easy reach of a telephone in the early part of the next century."

Internationally, universal service has no fixed definition. It is a concept that evolves as do technologies and socio-economic conditions. It has been defined in different ways in different countries. Indeed, there are even different terms such as public service obligations, community service, etc. Generally, universal service provision has meant the extension of telecommunications to remote and rural areas of countries so that everyone either has the option of having a telephone or is in easy reach of one. In some countries, universal service obligations include provision of service to the disabled and elderly as well as the under-privileged in urban areas, free access to emergency services, provision of operator assistance, directory service, and provision of public pay phones. (See also section on Universal Service in Chapter on Regulatory and Policy Issues).

The Report of the Independent Commission for World-wide Telecommunications Development published in 1984 set a universal service objective of a telephone within easy reach of all mankind. If "easy reach" in this context has been interpreted as*within one hour's walk*, it has not adequately taken into account the ubiquity of satellite services.

Many people today, including those in the developed world, no longer regard provision of a telephone as a sufficient basic service. With the advent of the Internet, many policy-makers now think access to the Net (e.g., e-mail and data communications) should form part of the right to

communicate. Given the prevalence of illiteracy and low incomes in some developing countries, however, Internet access may be a much more distant goal than access to plain old telephone service.

Even if it is highly unlikely that we will meet the challenge set by the Maitland Commission, there is nevertheless a significant new interest in ensuring universal service and access, especially including the provision of communications to remote and rural areas.

A political priority

The telephone has been described as "essential for citizenship". The growing awareness of just how important the telephone has become to enfranchisement, in daily life, in social and economic growth, has undoubtedly contributed to universal service having become a political priority in many countries.

At the G-7 Summit on the Information Society held in Brussels in February 1995, participating ministers identified "ensuring universal provision of and access to services" as one of the eight core principles behind the realization of their common vision of the Information Society.

In a recent ITU-D survey, 68 countries said they had a definition of universal access to basic services, which generally meant basic telephony. Seventy-nine said they had some form of universal service obligation on the telecommunication operators now, such as quality of service, expansion and improvement of the network, and interconnection. Several said public service obligations were included in the contract between the government and the operator. Some countries such as Mexico and Brazil have set political priorities of extending communications to all villages and towns of more than 500 people.

Satellite communications are, in many cases, the only practical solution to achieve universal service, either as part of a universal service obligation, or in the framework of achieving universal service access. GMPCS could be utilized to help realize these goals. GMPCS operators in the WTPF-96 agreed to voluntary principles to ensure global availability and affordability of their service. In most developing countries, the rural population has a low income. It may be necessary to overcome such handicaps with creative service pricing approaches, or to make use of Universal Service Obligation (USO) funds in providing universal service. However, just leaving it up to the market place alone is often not enough. Therefore having relevant universal service policies in the regulations or license conditions may be necessary to ensure that it happens.

From the operator's perspective, the new technology has changed the cost structures so drastically that it is less expensive to provide access to services than before to those in rural and remote areas. In contrast, a wireline-based service provider incurs very substantial additional fixed costs to extend service to rural and remote areas. For example, once deployed, the vast majority of fixed costs for a GMPCS system have been incurred, and the marginal cost of adding and servicing additional subscribers of GMPCS systems is relatively low.

Once government policy-makers have decided on a set of universal service objectives, they must then decide what, if any, regulatory action is necessary to ensure those objectives are met. For details, see the Report of the Second ITU Regulatory Colloquium "Universal Service and Innovation: Fostering Linked Goals through Regulatory Reform", (1993).

Financing universal service

While the benefits of universal service are relatively easy to identify, it has been rather more difficult to find a way of financing them, mainly for the obvious reason that it has been much more expensive to provide a telephone line to a subscriber in a remote area compared to a subscriber in the city.

It has been customary for State telecommunications monopolies to subsidize the use of the basic local telephone service from other telecommunication revenues. Incumbent telecommunications operators have usually applied geographically averaged rates in charging their customers, both for long-distance and local calling. This is likely to change as competition becomes more wide-spread. While some re-balancing of rates is probably inevitable, regulators will need to consider the impact of new services, such as GMPCS, in ensuring that differences in prices between high cost areas and low cost areas do not endanger the affordability of service in general. This has been the main philosophy for financing the implementation of, or attempts to achieve, universal service. Such cross-subsidization occurs between, for example:

- *long-distance and/or international and local communication;*
- *commercial and residential users; and*
- *urban and rural areas).*

If, indeed, a country decides to privatize the monopoly telecommunication operator and at the same time to allow competition in all or certain areas of service, it has to consider carefully how it will continue to ensure or promote the goal of universal service. There are, however, a few different approaches to financing universal service obligations, some of which are as follows.

A condition of licence (internal revenue transfers)

In some countries, the telecommunication operator must provide service to rural and remote areas as a condition of its licence. This generally means the urban subscriber is used to cross-subsidize the rural subscriber, or that revenues from long distance or international calls are used to offset the cost of providing service to the rural subscriber. Also, the government may set specific targets for the telecommunication operator regarding how many lines are expected to be installed each year.

Interconnection charge

In countries where there is competition, the government may require the new competitors to pay certain charges in order to interconnect with the dominant telecommunication operator. Some or all of those charges can be placed into a segregated fund and used to provide services to rural areas.

The European Commission envisages payments being made by competitors, either into an independent universal service fund at a national level which would make payments to operators providing universal service, or directly to operators providing universal service as an additional payment to the commercial charges for interconnecting with their network. A similar approach is being implemented by the FCC in the United States.

Pay or serve

In some countries, telecommunications operators have the choice of either paying certain charges (for example, into a universal service fund) or providing the service directly themselves. However, direct provision of service (i.e., serve) may be the preferable choice.

Licensing new entrepreneurs

In a variant of the pay or serve case, some countries may give the (typically dominant) telecommunications operator the choice of either providing service to rural areas or letting some other (typically small) private entrepreneurs provide the service. Where the telecommunications operator has to cope with long waiting lists in urban areas, it may be willing to let others provide services.

Government subsidy

In some countries, the rural subscribers pay only a fraction of the true cost of service. The government may subsidize the cost of rural service from its tax revenues. Some argue that the very positive socio-economic consequences of universal service on the functioning of the economy and the reductions in social costs associated with health care and other public services justify funding of universal service through general taxation rather than from within the telecommunication sector.

Governments can take two types of action to provide universal service. The first is to set universal service goals under telecommunication improvement plans, and the second is to impose legal obligations on telecommunication carriers to provide or to finance universal service.

No matter how universal service is financed, there should be transparency. Furthermore, most of the countries that signed the WTO Agreement on Basic Telecommunications adopted in whole or in part the "Reference Paper" which included the principle that universal service obligations will not be regarded as anti-competitive per se, provided they are administered in a transparent, non-discriminatory, and competitively neutral manner and are not more burdensome than necessary for the kind of universal service defined by the Member States.[5] Governments should also consider how cost-effectively resources are applied to achieving those targets.

Thus, if competition is to remain transparent, fair, and sustainable in the long term, it is worth considering the possibility of shifting from a policy of indiscriminately applied cross-subsidies to a policy of declared subsidies applicable to specific cases, for example the granting of a certain level of service free-of-charge to low-income users, or the construction of networks in areas that are not yet covered.

Rural and remote area development

Where investment in terrestrial telecommunications infrastructure often proves too costly or not economically justified, GMPCS is a worthwhile solution. In many developing countries, telecommunications for rural and remote area development has a high priority. However, the rural population has a low income. In evaluating the suitability of GMPCS systems in such cases, it is necessary to underline that there are not only economic benefits to be considered, but also social, cultural and political benefits, including improved public health, education, and availability of emergency communications. The increased welfare to rural and remote areas could also result in slowing down the migration of the rural population to overpopulated cities.

In a study of the potential demand for satellite-based mobile telecommunications systems, it is shown that the market can be divided into two distinct user categories, namely mobile and fixed. The mobile category can be further subdivided into the cellular in-fill and the international traveller. For developing countries, the market for fixed users, especially in the rural areas, is estimated to be

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[5] WTO Agreement, February 15, 1997, Regulatory Principles.

a considerable percentage of the total number of users. The study also shows that the market size hinges on the level of the tariff rate encountered. Numerically, a substantial market of fixed users is estimated not only for Asia, Africa, and South America, but for rural West and Eastern Europe as well.[6] This means that rural populations, and rural economies, are sure to benefit from the availability of GMPCS together with the other categories of users.

It is also important to recognize that GMPCS will bring services to areas where the density of customers and traffic per square kilometre is low, including to remote and isolated areas so that the fixed costs of terrestrial infrastructure are excessive in relation to expected revenue. This means that GMPCS systems can be regarded as an extension of terrestrial network coverage. GMPCS also provides the ability to adjust to situations of rapid changes in traffic demand and location of such demand. While the economic benefits of (terrestrial) network services are widely acknowledged, GMPCS enhances and complements such benefits through these unique capabilities.

An impressive example about how telecommunications can change economic conditions comes from Sam Pitroda, the Indian inventor and telecommunications expert who is currently Chairman of the Board of WORLDTEL. He tells the experience of a test run in Karnataka state. "In one town of 5,000 people with almost no previous telephone service, business activity rose many times following installation of an automatic digital exchange for 100 lines. In the six months after the introduction of service, total bank deposits in the town rose by an impressive 80 per cent. There were also social benefits." Telecommunications are also a necessary and basic infrastructure requirement for companies and industries interested in developing a country's natural resources, such as oil, gas, minerals and ores, forestry, etc., which in turn increases employment opportunities. If basic and enhanced services can be brought to a developing country, without any, or with relatively low direct investment requirements by the developing country, the indirect economic benefits generated by the availability of GMPCS services can be enjoyed faster and without spending the scarce capital resources of the developing country.

Affordable Prices

For any telecommunication service to be a viable solution for a country's needs, the issue of the rate charged to the end user is of obvious importance. For international or national business travellers, the convenience and benefit of being able to communicate or to be reached at practically any location, will define the threshold of the rates acceptable to this market segment. For non-voice and non-mobile GMPCS systems, the attractiveness lies in the easy and cost-effective "construction" of the terminal site at unserved or underserved locations. The prices that the market is willing to pay for these services may vary from country to country, and from sector to sector.

As contained in the***Checklist of Factors***, affordable prices are understood to mean: being at a level to make the services as widely utilized as possible in the country concerned. In a non-competitive environment the national regulatory body may have a significant role in setting the level of the service charges (tariffs). Whereas in situations where there is competition, the tendency is to leave it to market forces to arrive at the final figures. It seems clear that a number of charges, such as interconnection charges - which are external to the GMPCS system itself - could influence the price to the end user. The*Checklist of Factors* also highlights the need for regulators to take the appropriate regulatory decisions with regard to "interconnection fees," "government charges" and "transit charges -- if applicable" -- to enable GMPCS service providers to offer affordable prices.

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[6] Y.F.Hu and R.E. Sheriff, Electronics & Communication Engineering Journal, April 1997

The meaning of affordable prices is also relative, and connected to the affordability for individuals in relation to their income, especially when there are no alternative telecommunications services available. However, it is important that customers be able to choose the most appropriate, lowest-cost technology or system in achieving affordable prices. In this context, allowing competition among GMPCS systems will be instrumental in obtaining affordable prices.

Impact on existing networks and services

Perhaps one of the major concerns expressed by developing countries in regard to GMPCS access in their countries is bypass. Some developing countries believe that diversion of traffic from the existing networks to the GMPCS facilities (including international traffic) may lead to some revenue losses for national operators (non-GMPCS). In analyzing this issue, one must consider both the gain in revenues (because of the new traffic generated) as well as the traffic diverted from the national operators' networks. One should also bear in mind that the total number of GMPCS subscribers is only a fraction of the total number of (wireline) subscribers within the country, and consequently the total traffic generated by this number of subscribers is also relatively low.

Introducing GMPCS in a country is expected to generate new, additional traffic for existing networks, causing a positive impact. Innovative applications could also generate additional revenues for the existing network and for local entrepreneurs. This is particularly true because system operators expect that most of their calls will originate or terminate on the PSTN. The revenues earned by the gateway operators and service providers, and those earned by the terminal distributors, will be additional sources of income for the telecommunications service industry.

Although there might be physical bypass of the existing networks or facilities in some cases, this does not automatically mean a loss of revenues. The optimum solution should be discussed and agreed upon during negotiations with the national regulator when GMPCS services are being licensed. Such negotiations should take into account market access considerations, notably that national telecommunications markets should be progressively liberalized through transition arrangements characterized by transparency, non-discrimination and competitive regulatory arrangements.

National benefits

Among the direct economic benefits are:

- immediate availability of a global network which can be used for national and international communications without the need for a large capital investment within the country;
- revenues for the public telecommunications operator, cellular operators, and local service providers;
- returns from direct investment in the GMPCS systems, or from local ownership of a gateway or SPs, or from other forms of participation in the distribution;
- national benefits from tax revenues due to increased traffic over fixed and cellular networks.

Among the indirect economic benefits are:

- growth of business activity and increases in local telecommunications revenues;
- assistance to remote and rural development, including slowing down the migration to urban areas;
- opportunity to fulfill universal service objectives.

Benefits are affected by size, population and resources of the country, and extent of its telecommunications infrastructure.

Participation in ownership

Local involvement in the operation of GMPCS seems to be an attractive feature both for decision-makers as well as for the economic community of developing countries. National and local bodies in developing countries can benefit from involvement in GMPCS services through equity ownership in:

- the GMPCS entity
- local service providers
- gateways and gateway facilities
- distribution channels for terminals.

GMPCS operators are generally open to participation in ownership by national (local) entities, including ownership in some component of the GMPCS system, through partnership investment or purchase of publicly-traded securities. It should also be clear, however, that even without any capital outlay or participation in ownership of the space segment, countries or economies could be participants in virtually any system through the above-mentioned opportunities, and can thus reap the benefits too. Depending on the size, economy, and policy of each country, the options for the national operators will vary.

Transfer of know-how

Transfer of technical and managerial know-how is an important matter for most developing countries. Depending on the prevailing local conditions, schemes and programs for transfer of know-how can be developed between the GMPCS operator and the national authorities.

Transfer of know-how to the national service provider is in the general interest of the GMPCS system operators. Transfer of know-how in technical and managerial matters concerning GMPCS is both desirable and necessary for a country. Some GMPCS entities have expressed the view that as part of the introduction of GMPCS in a country, such transfers should take place. Among the subjects are engineering, maintenance, operations, marketing and billing. Indeed, a two-way traffic in terms of information exchange is expected by GMPCS operators, in order to optimize the system for the particular country concerned. However, different system operators will adopt different ways and means to transfer know-how in an effective and efficient manner.

Global and regional cooperation

Areas in which global and regional cooperation is beneficial or required include among others:

- approval of GMPCS terminals
- sharing a GMPCS gateway with a neighbouring country
- training and transfer of know-how on GMPCS

Most regions have one or more organizations devoted to telecommunications development. The work of these organizations is appreciated and should continue, in order to assist national regulators, GMPCS companies, and service providers in the region. Cooperation between countries of the region is feasible in a number of situations, e.g., in type-approval of GMPCS terminals, in the shared use of a gateway, in education and training, etc.

SOCIAL IMPACTS

Extending telecommunications to remote areas helps link people together and provide a means of contact between families and friends separated by distance. With 70 per cent or more of populations in developing countries living in rural areas, political leaders increasingly see universal service as a political priority in uniting their country. Facilitating the participation of the large populations in remote and rural areas of developing countries in the social, economic, cultural, and political activities of their countries, will enhance national unity and regional, as well as global, interaction and integration. GMPCS service will also assist in the extension of government and social services. Telecommunications through GMPCS also provides a means of enhanced access to government and social services, such as health and education, thereby lessening the pressure of migration to urban areas.

Health care

In healthcare, for example, GMPCS technology may enable doctors and caregivers to consult with specialists thousands of miles away, share medical records and images, relay critical information during epidemics, and distribute globally the latest results of their research. The technology can also expedite routing of medical supplies during disaster-relief efforts and allow caregivers to provide remote instruction in nutrition, sanitation and infant care.

Education

The availability of GMPCS service enables developing nations to harness the benefits of advanced educational techniques and basic literacy development for local populations in both urban centres and rural areas. The development of "distance-learning" programmes, i.e. education via satellite transmission, can link existing educational resources with schoolchildren and individuals who seek to improve literacy and job-related skills.

Emergency communications

Disasters, whether natural, such as volcanic eruptions, floods, earthquakes or man-made (such as oil spills, forest fires) often occur in remote areas. The availability of GMPCS can help mitigate the destructive consequences. The availability of GMPCS also improves security. Citizens at risk or in an emergency can call the authorities for help.

Remote areas that only access the telecommunication network through GMPCS systems will need easy contact with the emergency structures including hospitals, police, etc. Due to their global nature and the versatility of their terminals, GMPCS systems are well-suited to assisting national authorities in responding to emergencies.

Telecommunications play a vital role in environmental protection. They also can be used to monitor pipelines, river levels, crop growth, drought and flood areas. The use of GMPCS can assist in locating missing persons, reducing or eliminating poachers, and stopping the illegal felling of trees. As in the case of economic benefits, the extent of the social benefits depends on the conditions in the respective developing country.

OBSERVATIONS

GMPCS systems are intended to be complementary to - not in competition with - the existing wireline and terrestrial fixed and mobile services in a country. Many benefits, direct and indirect economic benefits as well as social benefits, will accrue to developing countries by the availability of GMPCS services in the country. GMPCS systems can offer a means of extending basic telecommunications infrastructure in developing countries.

Further, GMPCS services can facilitate the provision of universal access as well as provide a part of the infrastructure for rural and remote area development. GMPCS has a great potential to assist the provision of universal service, in particular it can quickly provide services to remote and rural areas which currently do not have access to telephones. GMPCS operators may consider the possibility of offering special (low) tariffs for community telecommunication centres in developing countries.

The impact of bypassing the existing national networks can be offset by the new, additional traffic generated for the existing networks by GMPCS and agreed upon accounting procedures developed by the National Administration and GMPCS service providers. Benefits can be enhanced through equity participation in the various elements of the GMPCS system, as considered appropriate by each country. Affordability of prices for GMPCS services can be stimulated by allowing competition among systems.

Successful adaptation or integration of GMPCS with the existing networks and services to provide information exchange to achieve economic and social benefits will assist in reducing rural to urban migration as productivity increases, poverty is progressively reduced, and the quality of life for rural people improves.

Transparent and pragmatic policies and regulatory frameworks are important to ensure that introduction of GMPCS services enhance the economic and social benefits obtained while reducing possible negative impacts. The creation of partnerships between local and foreign stakeholders including the small end-users in remote and rural areas will serve as a catalyst to this end.

Once GMPCS systems are deployed, it may be useful to review (e.g., through case studies) the social and economic impact of GMPCS to developing countries.

ANNEX 1

OPINION No. 5

Implementation of GMPCS in Developing Countries

The First World Telecommunication Policy Forum (Geneva, 1996)

recognizing

that GMPCS systems offer significant benefits to the public both in the developing and developed countries;

recognizing further

that while the benefits and potential of GMPCS have not been challenged, nevertheless some countries have concerns about the political, economic, social and cultural impacts of the emerging new systems;

considering

a) that GMPCS systems built and financed mainly by private investors will offer advanced telecommunications services that would otherwise be cost prohibitive to develop or operate;

b) that developing countries may stand to benefit from these advanced services and in particular where terrestrial infrastructure is limited or non-existent;

c) that GMPCS has the potential of narrowing the existing gap in the provision of telecommunications services between developed and developing countries;

considering further

a) that developing countries ought to benefit from the introduction of the latest technology in the field of telecommunications;

b) that these countries face unique problems such as the lack of, or minimal, interconnectivity between terrestrial networks, however, initiatives are being taken in order to interconnect developing countries through submarine cables, fibre optic cables, microwave links, satellite, etc.

c) that terrestrial connectivity is essential when introducing GMPCS in order to ensure that good quality service is maintained;

conscious

a) that for GMPCS services to be available as widely as possible, the participation of developing countries is essential and should be encouraged, within their capacity to do so;

b) that there is concern that the charges for access and utilization of GMPCS services may well be beyond the means of the local populace in developing countries, particularly those that live in rural and remote areas;

of the view

that it would be useful to study, as a matter of urgency, the policy, social, cultural and economic impacts of the new systems and to identify the net benefits that developing countries may derive from them;

urges

a) GMPCS system operators and service providers to consider including as part of their corporate mission the commitment to offer their services as a further means to contribute to the attainment by developing countries of the goal of universal access;

b) GMPCS system operators, gateway operators, and service providers to take reasonable steps to ensure that their access and utilization charges are set at a level that would make this service as widely utilized as possible including in rural and remote areas and areas lacking conventional infrastructure in developing countries, taking into account the cost of providing service and the economic situation in developing countries;

c) GMPCS system operators consider providing some capacity at reasonable cost in support of service provision to areas lacking conventional infrastructure in developing countries;

d) GMPCS gateway operators to consider offering transport tariffs at reasonable cost in support of service provision to rural and remote areas in developing countries;

invites the Director of the BDT, in liaison with the Directors of the other Bureaux

1. to establish a group of experts especially from developing countries to carry out the following tasks:

   a) to prepare, as soon as possible and not later than July 1997, a checklist of factors which developing countries may take into account in the process of introducing GMPCS services;

   b) to advise and assist in response to the concerns and needs of the developing countries on the technical and regulatory issues associated with the introduction of GMPCS on a global or regional basis, particularly in relation to tariffs and interconnectivity;

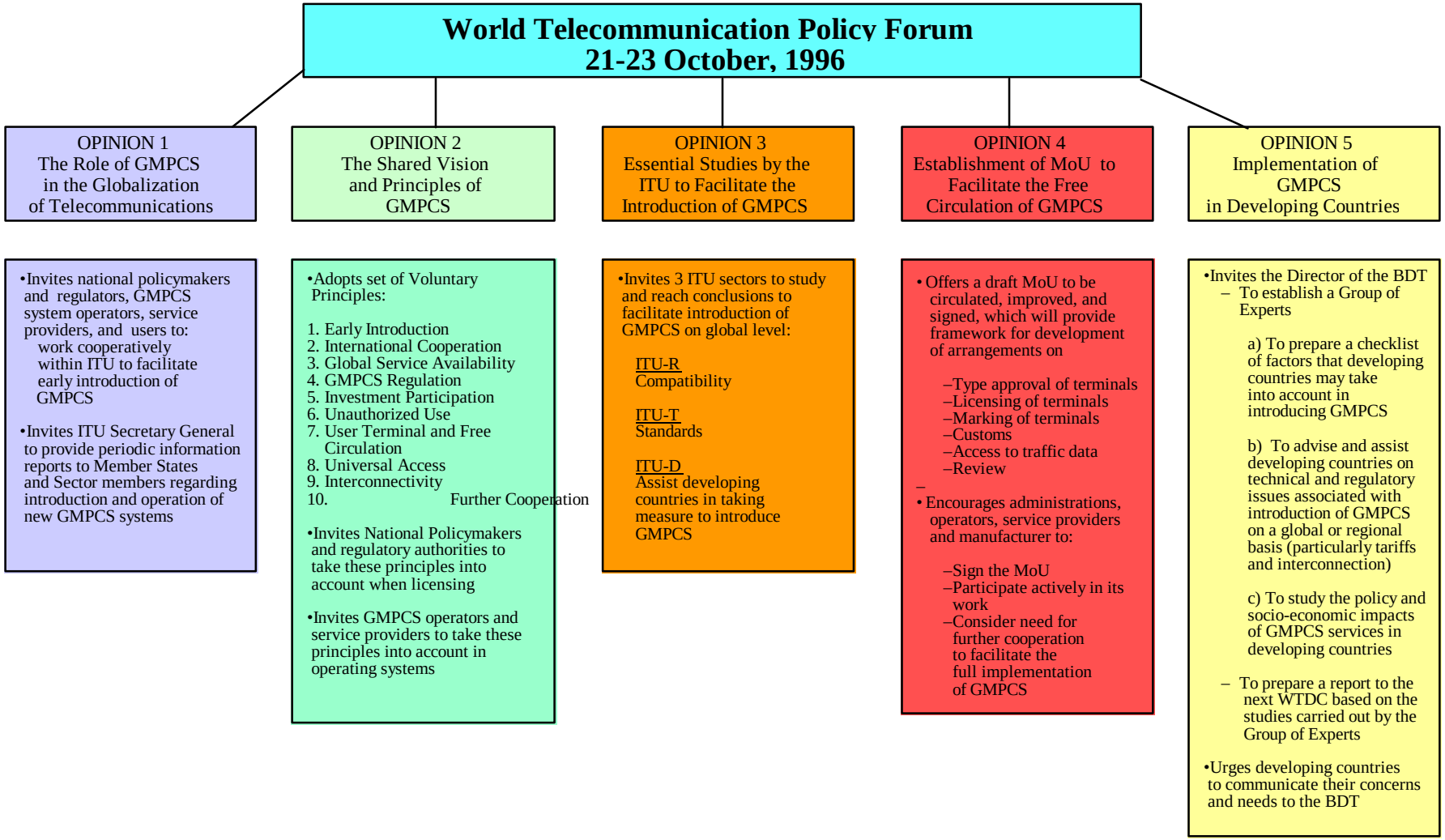
   c) to study the policy and socio-economic impacts of GMPCS services in developing countries;

2. to prepare a report to the next World Telecommunication Development Conference based on the studies carried out by the group of experts.;

urges further

developing countries to communicate their concerns and needs to the BDT.

ANNEX 2


World Telecommunication Policy Forum
21-23 October, 1996
OPINION 1
The Role of GMPCS in the Globalization of Telecommunications
•Invites national policymakers and regulators, GMPCS system operators, service providers, and users to:
work cooperatively within ITU to facilitate early introduction of GMPCS
•Invites ITU Secretary General to provide periodic information reports to Member States and Sector members regarding introduction and operation of new GMPCS systems
OPINION 2
The Shared Vision and Principles of GMPCS
•Adopts set of Voluntary Principles:
1. Early Introduction
2. International Cooperation
3. Global Service Availability
4. GMPCS Regulation
5. Investment Participation
6. Unauthorized Use
7. User Terminal and Free Circulation
8. Universal Access
9. Interconnectivity
10. Further Cooperation
•Invites National Policymakers and regulatory authorities to take these principles into account when licensing
•Invites GMPCS operators and service providers to take these principles into account in operating systems
OPINION 3
Essential Studies by the ITU to Facilitate the Introduction of GMPCS
•Invites 3 ITU sectors to study and reach conclusions to facilitate introduction of GMPCS on global level:
ITU-R
Compatibility
ITU-T
Standards
ITU-D
Assist developing countries in taking measure to introduce GMPCS
OPINION 4
Establishment of MoU to Facilitate the Free Circulation of GMPCS
• Offers a draft MoU to be circulated, improved, and signed, which will provide framework for development of arrangements on
–Type approval of terminals
–Licensing of terminals
–Marking of terminals
–Customs
–Access to traffic data
–Review
–
• Encourages administrations, operators, service providers and manufacturer to:
–Sign the MoU
–Participate actively in its work
–Consider need for further cooperation to facilitate the full implementation of GMPCS
OPINION 5
Implementation of GMPCS in Developing Countries
•Invites the Director of the BDT
– To establish a Group of Experts
a) To prepare a checklist of factors that developing countries may take into account in introducing GMPCS
b) To advise and assist developing countries on technical and regulatory issues associated with introduction of GMPCS on a global or regional basis (particularly tariffs and interconnection)
c) To study the policy and socio-economic impacts of GMPCS services in developing countries
– To prepare a report to the next WTDC based on the studies carried out by the Group of Experts
•Urges developing countries to communicate their concerns and needs to the BDT

ANNEX 3

Memorandum of Understanding-GMPCS (Geneva, 6-7 October 1997)

Document 14-E
7 October 1997
Original: English

ARRANGEMENTS PURSUANT TO THE GMPCS MoU TO FACILITATE THE INTRODUCTION AND DEVELOPMENT OF GLOBAL MOBILE PERSONAL COMMUNICATIONS BY SATELLITE (GMPCS)

(As agreed at the Third Meeting of Signatories and Potential Signatories of the GMPCS-MoU, Geneva, 6-7 October 1997)

I. INTRODUCTION

On 21-23 October 1996, the first ITU World Telecommunication Policy Forum (WTPF) met in Geneva to discuss "Global Mobile Personal Communications by Satellite" (GMPCS). That meeting was attended by 833 delegates, representing 128 Member States and 70 Sector Members. At that meeting, the WTPF engaged in a general discussion of the policy and regulatory issues raised by the early introduction of GMPCS services. By consensus, the WTPF adopted five Opinions, which are reflected in the Report by the Chairman of the WTPF (Final Report dated 22 December 1996).

Opinion No. 2 of the first WTPF called for Administrations to facilitate the early introduction of GMPCS services and to cooperate internationally in developing and harmonizing policies to facilitate the introduction of GMPCS. Opinion No. 2 also recognized that GMPCS System Operators will take steps to inhibit the use of their systems in any country that has not authorized their GMPCS service.

Opinion No. 4 adopted by the WTPF recognized that, because some GMPCS systems are already in operation and others will be brought into operation as early as 1998, urgent action is needed to facilitate the global circulation and transborder roaming of terminals. Opinion No. 4 also recognized that the early introduction of GMPCS services will be facilitated by a commonly agreed upon GMPCS Memorandum of Understanding (MoU) to be used as a framework for arrangements to facilitate the global circulation and transborder roaming of GMPCS Terminals.

On 14 February 1997, pursuant to Opinion No. 4, an informal group of Administrations, GMPCS operators, service providers, and manufacturers met and finalized the GMPCS-MoU.

II. PREAMBLE

The GMPCS Arrangements that follow have been developed, pursuant to Opinion No. 4 and the related GMPCS-MoU, by Administrations and/or Competent Authorities, ITU Sector Members, GMPCS System Operators, GMPCS Service Providers, and Manufacturers of GMPCS Terminals. The objective of these Arrangements is to provide a framework for the introduction of GMPCS, including: 1) the permission to carry a terminal into a visited country and to use it, within the

framework of a licensing scheme (i.e. without the need for obtaining individual authorization for the terminal in the visited country); 2) the permission to carry the terminal into a visited country but not to use it; and 3) the technical conditions for placing terminals on the market. Under the provisions of these Arrangements, the participants will be able to cooperate in the development of GMPCS to the benefit of users worldwide. The benefits of GMPCS will be fully realized when a significant number of Administrations and/or Competent Authorities offer necessary authorization for service provision and access to spectrum.

III. SCOPE OF THESE ARRANGEMENTS

1. These Arrangements do not alter or affect the sovereign right of each Administration and/or Competent Authority to regulate its telecommunications, as recognized in the Constitution and Convention of the ITU.

2. All Administrations and/or Competent Authorities, ITU Sector Members, GMPCS System Operators, GMPCS Service Providers, and GMPCS Terminal Manufacturers are invited to implement these Arrangements. Implementation of these Arrangements or any of their provisions is voluntary.

3. It is the intention and understanding of all parties implementing these Arrangements that the Arrangements are consistent with and in furtherance of the GMPCS-MoU, the voluntary principles adopted by the WTPF as contained in Opinion No. 2, and the relevant treaty provisions of the ITU legal instruments.

4. These Arrangements provide a framework for the following:
   a) Facilitation of mutual recognition of Type Approvals of GMPCS Terminals;
   b) Simplified licensing of GMPCS Terminals;
   c) A method of identification (marking) of GMPCS Terminals;
   d) Access to traffic data by authorized national authorities.

5. Pursuant to Article 4 of the GMPCS-MoU, a Recommendation on the principles for customs procedures to facilitate unrestricted transborder movement of GMPCS terminals is also included.

IV. DEFINITIONS

Unless otherwise indicated, the terms listed below will have the following meanings for purposes of the Arrangements and Recommendations herein:

1. **Administration** - Any governmental department or service responsible for implementing these Arrangements or parts thereof.

2. **Circulation** - Ability to carry a GMPCS Terminal into a visited country. In these Arrangements, circulation includes:
   a) Permission to carry a terminal into a visited country and to use it within the framework of a licensing scheme (i.e., without the need for obtaining individual authorization for the terminal in the visited country); and
   b) Permission to carry a terminal into a visited country but not to use it.

3. **Competent Authority** - Any organization competent for regulatory issues addressed in these Arrangements.

4. **Constellation of satellites** - One or more satellites, geostationary or non-geostationary, operated as a system.

5. **GMPCS Service Provider** - Any entity commissioned by a GMPCS System Operator to provide GMPCS services to the public within a country and which may require an authorization to do so under the applicable legislation of the country concerned.

6. **GMPCS System** - Any satellite system (i.e., fixed or mobile, broadband or narrow-band, global or regional, geostationary or non-geostationary, existing or planned) providing telecommunication services directly to end users from a constellation of satellites.

7. **GMPCS System Operator** - The entity responsible for the operation of a GMPCS System.

8. **GMPCS Terminal** - A user terminal intended to be operated with a GMPCS System.

9. **License** - An authorization to carry and use a GMPCS Terminal. According to the national regime, the license can be any of the following:

   a) An individual license, whereby for each terminal a separate authorization is issued;

   b) A general license or class license, whereby one generic authorization is issued, which applies to all users and to all terminals of a given category;

   c) A license exemption, whereby there is an exemption from requiring an individual license for each terminal;

   d) A blanket license, whereby an operator or service provider is authorized to use a certain number of technically identical terminals.

10. **Licensing** - The issuance of a license or other authorization by an Administration and/or Competent Authority in conformity with the national laws and regulations of that country and the ITU Radio Regulations and relevant Resolutions.

11. **Sector Member** - An entity or organization authorized to participate in the work of one or more Sector(s) of the ITU in conformity with the relevant provisions of the ITU Convention.

12. **Type Approval** - The process through which the conformity of GMPCS Terminals with regulatory technical requirements is assessed. These technical requirements are mainly intended to ensure that GMPCS Terminals do not harm networks, GMPCS users, other users, or other equipment. A variety of procedures (ranging from obligatory third party testing to manufacturer's declaration) may be in place.

13. **Single mode terminal** - A terminal which is capable of operating with only one GMPCS system.

14. **Multimode terminal** - A terminal which is capable of operating with a GMPCS system and, additionally, one or more other GMPCS systems or terrestrial mobile systems.

15. **GMPCS - MoU Mark** - A Mark, agreed upon by the Signatories of the GMPCS-MoU, that may be affixed on GMPCS Terminals pursuant to these Arrangements. The appearance of the Mark, including its size and wording, will be determined by the signatories of the GMPCS-MoU with appropriate consultations with other affected parties.

V. GENERAL PROVISIONS

The Administrations and/or Competent Authorities, ITU Sector Members, GMPCS System

Operators, GMPCS Service Providers, and GMPCS Terminal Manufacturers implementing these Arrangements understand and recognize that:

1. A variety of GMPCS Systems are at different stages of development and implementation, including some already in service.

2. GMPCS Systems provide or will provide global and/or regional coverage.

3. GMPCS Systems will typically be characterized by the use of system-specific GMPCS Terminals, manufactured by GMPCS Terminal Manufacturers and designed to be operated with specific GMPCS Systems.

4. The bringing into operation of new GMPCS Systems is subject to satisfactory progress of frequency coordination in accordance with the procedures established by the ITU Radio Regulations and relevant Resolutions.

5. The use of the spectrum, assigned by Administrations and/or Competent Authorities for GMPCS Terminals used with GMPCS Systems, will be in accordance with the allocations of the ITU Radio Regulations and relevant Resolutions.

6. Because Administrations and/or Competent Authorities have various Type Approval procedures under differing legal regimes, it will not be possible to arrive at a single procedure in the short term; however, it is desirable for Administrations and/or Competent Authorities to mutually recognize Type Approval and marking procedures for GMPCS Terminals.

7. It is desirable for Administrations and/or Competent Authorities to continue to strive for a single procedure for Type Approval.

8. The exemption of GMPCS Terminals from a requirement for an individual license facilitates regional and global circulation and transborder roaming.

9. Administrations and/or Competent Authorities, GMPCS System Operators and GMPCS Service Providers will likely specify data exchange requirements in order to service customers properly and to best comply with national legislative or regulatory requirements.

10. Existing and planned GMPCS Systems will vary technically in the level of detail of information captured by the System.

11. GMPCS System Operators and GMPCS Service Providers are subject to the national laws and regulations in each country in which GMPCS Services are being provided.

12. Customer specific information must be protected by GMPCS System Operators and GMPCS Service Providers as private and confidential information.

13. Each GMPCS System Operator shall take steps to inhibit the use of its system in any country that has not authorized its GMPCS service.

14. GMPCS Terminals brought into a country to be placed on the market will be subject to applicable customs duties, if any, and the technical and regulatory requirements of that country.

VI. SPECIFIC PROVISIONS

The Administrations and/or Competent Authorities, ITU Sector Members, GMPCS System Operators, GMPCS Service Providers, and GMPCS Terminal Manufacturers implementing these Arrangements agree to the following specific provisions:

A. Type Approval and Marking of GMPCS Terminals (GMPCS-MoU Articles 1 and 3)

1. GMPCS Terminals may be required to meet the following requirements (hereinafter referred to as "essential requirements"):

   a) Safety;

   b) Electromagnetic compatibility (EMC); and

   c) Effective use of the radio spectrum and orbital resources, including electromagnetic interference (EMI).

2. Compliance with the above essential requirements may be demonstrated, at the discretion of the relevant Administration and/or Competent Authority, by conformity to appropriate ITU-R Recommendations, international, regional, or national standards, or technical specifications. Manufacturers may, at the discretion of the relevant Administration and/or Competent Authority, be allowed to demonstrate compliance by other means.

3. Administrations and/or Competent Authorities will make their national administrative procedures for Type Approval publicly available, non-discriminatory, and consistent with the objectives of these Arrangements. It is recommended that Administrations and/or Competent Authorities consider whether compliance can be demonstrated through a declaration from the GMPCS Terminal Manufacturer without additional procedures.

4. An Administration and/or Competent Authority that has issued Type Approval pursuant to these Arrangements for a class of GMPCS Terminals is encouraged to notify the ITU, upon the request of the GMPCS Terminal Manufacturer, specifying:

   a) Name of the Administration and/or Competent Authority;
   b) Name of GMPCS Equipment Manufacturer;
   c) Name of GMPCS System Operator;
   d) Model number(s) or similar identifying information of GMPCS Terminal(s); and
   e) The date Type Approval was granted.

   Administrations and/orCompetent Authorities are also encouraged to submit to the ITU copies of the standards, specifications, and/or procedures used for Type Approval.

5. A GMPCS Terminal Manufacturer may affix the GMPCS-MoU Mark to a GMPCS Terminal provided that the following conditions are met:

   a) At least one Administration and/or Competent Authority having implemented these Arrangements has issued a Type Approval for a class of GMPCS Terminals which includes the unit and has notified this to the ITU in accordance with paragraph 4 of this Arrangement;

   b) The Operator of the GMPCS System with which the subject GMPCS Terminal is to be used has notified the ITU that it has implemented these Arrangements and that it has authorized the subject GMPCS Terminal for connection to its GMPCS System; and

   c) The GMPCS Terminal Manufacturer has notified the ITU that it has implemented these Arrangements.

   d) The GMPCS Terminal Manufacturer has been authorized to affix the GMPCS-MoU Mark by an entity designated by the signatories of the GMPCS-MoU to authorize use of the GMPCS-MoU Mark.

6. Administrations and/or Competent Authorities are encouraged to accept the Type Approval granted by other Administrations and/or Competent Authorities denoted by the GMPCS-MoU Mark or any other mark evidencing Type Approval without the need for additional testing or the submission of test reports. Such acceptance may be subject to the successful conclusion of mutual recognition agreements on conformity assessment or other reciprocal arrangements. Administrations and/or Competent Authorities are encouraged to accept, whenever possible, existing test reports.

B. Licensing
(GMPCS-MoU Article 2)

1. Administrations and/or Competent Authorities that have implemented these Arrangements are recommended not to require individual licenses for GMPCS Terminals, provided that:
   a) these terminals operate within the frequency bands identified for such use by the Administration and/or Competent Authority in question;
   b) the GMPCS service, with which the GMPCS Terminalsoperate, has been legally authorized if required, pursuant to national laws and/or regulations;
   c) the transmissions from the GMPCS Terminals are under the operational control of the GMPCS System Operator and/or the GMPCS Service Provider;
   d) the GMPCS Terminals meet the relevant essential requirements in these Arrangements; and
   e) necessary measures are taken to avoid harmful interference between services.
2. Administrations and/or Competent Authorities are recommended to cooperate in the development of GMPCS to the benefit of all users and to offer authorization of service provision and access to frequency spectrum, subject to national laws and regulations.
3. Administrations and/or Competent Authorities implementing these Arrangements are recommended to allow the circulation and use of GMPCS Terminals, either single mode or multimode, provided that the GMPCS Terminals have been demonstrated to meet the essential requirements in these Arrangements, as may be indicated by the presence of the GMPCS-MoU Mark or another recognized mark.
4. Administrations and/or Competent Authorities that have implemented these Arrangements are recommended to allow the circulation of GMPCS Terminals (either single mode or multimode) on a temporary or transitory basis without permission to use for all GMPCS systems.
5. Administrations and/or Competent Authorities implementing these Arrangements may, consistent with these Arrangements, issue blanket or class licenses for GMPCS Terminals or may exempt the GMPCS Terminals from individual licenses.

C. Access to Traffic Data
(GMPCS-MoU Article 5)

1. Consistent with applicable national legislation in the country where GMPCS service has been authorized, and recognizing technical differences between systems existing and planned, GMPCS system operators or service providers will provide to Administrations

and/or Competent Authorities implementing these Arrangements, on a confidential basis, within a reasonable period of time to any authorized national authority which so requests, agreed GMPCS traffic data originating in or routed to its national territory; and will assist with measures intended to identify unauthorized traffic flows.

2. Under these Arrangements, all future designed GMPCS systems should be structured to provide appropriate traffic data.

3. Existing Agreements between Administrations and/or Competent Authorities and GMPCS System Operators and/or GMPCS Service Providers will not be affected by these Arrangements.

4. Traffic data to be provided pursuant to these Arrangements do not include confidential customer information, except as provided for by national laws and regulations in each country in which GMPCS services are being provided.

D. ***Recommendations on Customs Matters (GMPCS-MoU Article 4)***

The Administrations and/or other Competent Authorities, implementing these Arrangements should recommend to their competent national authorities that:

1. Duties on GMPCS Terminals placed on the market be reduced or removed, in particular by signing instruments such as the Information Technology Agreement.

2. GMPCS Terminals be exempt from customs-related restrictions and fees when visiting or transiting countries on a temporary basis.

3. Administrations and/or other Competent Authorities, as well as the ITU Secretariat, if appropriate, work with the World Customs Organization to ensure that GMPCS Terminals are entitled to treatment as a traveller's personal effects for purposes of entry into a country on a temporary or transitory basis.

4. Administrations and/or Competent Authorities undertake, within the framework of their national laws, regulations, and international obligations, to bring their legal and regulatory procedures in line with the provisions of the Istanbul Convention on Temporary Admission, and other relevant internationally recognized agreements.

5. Administrations and/or Competent Authorities take all practicable measures to bring to the attention of customs officials the need to permit the temporary or transitory entry into their countries of GMPCS Terminals without unduly burdensome restrictions.

VII. NOTIFICATION AND IMPLEMENTATION PROCEDURES

1. The ITU Secretary-General will write to all Administrations and/or Competent Authorities, Sector Members, Signatories to the GMPCS-MoU, and all non-signatories that have been participating in the development of these Arrangements inviting them to implement these Arrangements.

2. Administrations and/or Competent Authorities, ITU Sector Members, GMPCS System Operators, GMPCS Service Providers, and GMPCS Terminal Manufacturers intending to implement these Arrangements are encouraged to notify the ITU Secretary-General at the earliest possible date their intention to implement the Arrangements and the date by which the Arrangements are planned to be implemented. Upon implementation of the Arrangements, Administrations and/or Competent Authorities, ITU Sector Members, GMPCS System Operators, GMPCS Service Providers, and GMPCS Terminal

Manufacturers that have implemented these Arrangements will notify the ITU Secretary-General how these Arrangements have been implemented. To this end:

a) Administrations and/or Competent Authorities intending to implement these Arrangements on a national level are encouraged to ensure that relevant national telecommunications regulations and customs requirements support the full realization of the goals of these Arrangements.

b) Administrations and/or Competent Authorities implementing these Arrangements should notify the Secretary-General of the specific GMPCS Systems that are authorized to operate in the country.

c) GMPCS System Operators that implement these Arrangements should inform the Secretary-General which GMPCS Terminals are authorized for connection to their systems and which GMPCS Service Providers are authorized by them.

d) Administrations and/or Competent Authorities, ITU Sector Members, GMPCS System Operators, GMPCS Service Providers, and GMPCS Terminal Manufacturers should inform the Secretary-General of any provisions of these Arrangements they do not intend to implement.

e) The ITU Secretary-General should be notified of any changes in the information provided pursuant to these Arrangements.

3. The Secretary-General of the ITU will be the depository of these Arrangements and will make information about the Arrangements readily available to all Administrations and/or Competent Authorities, all Sector Members, all GMPCS System Operators, all GMPCS Service Providers, and all GMPCS Terminal Manufacturers. The ITU will also maintain a list of standards and specifications that are used for Type Approval.

4. The Secretary-General will periodically publish, including electronically, a report on the implementation of these Arrangements, which will include: a list of all entities that have implemented the Arrangements, or any part thereof; the GMPCS Systems that are authorized in each country; a list of the GMPCS Terminals that have been granted approval pursuant to these Arrangements indicating the countries that have granted Type Approval; and such other information as may be requested by the Signatories to the MoU and/or the entities that have notified the ITU that they have implemented these Arrangements.

5. Some of the provisions in these Arrangements may require action and ongoing activities by the ITU. The entities implementing these Arrangements are invited to work with the ITU to ensure that the ITU has the capability, authority, and resources to perform the functions it is expected to perform pursuant to these Arrangements.

ANNEX 4

18 March 1998

DRAFT REPORT BY THE CHAIRMAN

WTO reference paper on basic telecommunications[1]

Scope

The following are definitions and principles on the regulatory framework for the basic telecommunications services.

Definitions

Users mean service consumers and service suppliers.

Essential facilities mean facilities of a public telecommunications transport network or service that

(a) are exclusively or predominantly provided by a single or limited number of suppliers; and

(b) cannot feasibly be economically or technically substituted in order to provide a service.

A major supplier is a supplier which has the ability to materially affect the terms of participation (having regard to price and supply) in the relevant market for basic telecommunications services as a result of:

(a) control over essential facilities; or

(b) use of its position in the market.

1 Competitive safeguards

1.1 Prevention of anti-competitive practices in telecommunications

Appropriate measures shall be maintained for the purpose of preventing suppliers who, alone or together, are a major supplier from engaging in or continuing anti-competitive practices.

1.2 Safeguards

The anti-competitive practices referred to above shall include in particular:

(a) engaging in anti-competitive cross-subsidization;

(b) using information obtained from competitors with anti-competitive results; and

(c) not making available to other services suppliers on a timely basis technical information about essential facilities and commercially relevant information which are necessary for them to provide services.

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[1] For more information about the WTO basic telecommunications agreement, please see the WTO Web site at: http://www.wto.org

2 Interconnection

2.1 This section applies to linking with suppliers providing public telecommunications transport networks or services in order to allow the users of one supplier to communicate with users of another supplier and to access services provided by another supplier, where specific commitments undertaken.

2.2 Interconnection to be ensured

Interconnection with a major supplier will be ensured at any technically feasible point in the network. Such interconnection is provided.

(a) under non-discriminatory terms, conditions (including technical standards and specifications) and rates and of a quality no less favourable than that provided for its own like services or for like services of non-affiliated service suppliers or for its subsidiaries or other affiliates;

(b) in a timely fashion, on terms, conditions (including technical standards and specifications) and cost-oriented rates that are transparent, reasonable, having regard to economic feasibility, and sufficiently unbundled so that the supplier need not pay for network components or facilities that it does not require for the service to be provided; and

(c) upon request, at points in addition to the network termination points offered to the majority of users, subject to charges that reflect the cost of construction of necessary additional facilities.

2.3 Public availability of the procedures for interconnection negotiations

The procedures applicable for interconnection to a major supplier will be made publicly available.

2.4 Transparency of interconnection arrangements

It is ensured that a major supplier will make publicly available either its interconnection agreements or a reference interconnection offer.

2.5 Interconnection: dispute settlement

A service supplier requesting interconnection with a major supplier will have recourse, either:

(a) at any time or

(b) after a reasonable period of time which has been made publicly known to an independent domestic body, which may be a regulatory body as referred to in paragraph 5 below, to resolve disputes regarding appropriate terms, conditions and rates for interconnection within a reasonable period of time, to the extent that these have not been established previously.

3 Universal service

Any Member has the right to define the kind of universal service obligation it wishes to maintain. Such obligations will not be regarded as anti-competitive per se, provided they are administered in a transparent, non-discriminatory and competitively neutral manner and are not more burdensome than necessary for the kind of universal service defined by the Member.

4 Public availability of licensing criteria

Where a licence is required, the following will be made publicly available:

(a) all the licensing criteria and the period of time normally required to reach a decision concerning an application for a licence and

(b) the terms and conditions of individual licences.

The reasons for the denial of a licence will be made known to the applicant upon request.

5 Independent regulators

The regulatory body is separate from, and not accountable to, any supplier of basic telecommunications services. The decisions of and the procedures used by regulators shall be impartial with respect to all market participants.

6 Allocation and use of scarce resources

Any procedures for the allocation and use of scarce resources, including frequencies, numbers and rights of way, will be carried out in an objective, timely, transparent and non-discriminatory manner. The current state of allocated frequency bands will be made publicly available, but detailed identification of frequencies allocated for specific government uses is not required.

ATTACHMENT

WTO reference paper on basic telecommunications[1]

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(b) using information obtained from competitors with anti-competitive results; and

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2.2 Interconnection to be ensured

Interconnection with a major supplier will be ensured at any technically feasible point in the network. Such interconnection is provided.

(a) under non-discriminatory terms, conditions (including technical standards and specifications) and rates and of a quality no less favourable than that provided for its own like services or for like services of non-affiliated service suppliers or for its subsidiaries or other affiliates;

(b) in a timely fashion, on terms, conditions (including technical standards and specifications) and cost-oriented rates that are transparent, reasonable, having regard to economic feasibility, and sufficiently unbundled so that the supplier need not pay for network components or facilities that it does not require for the service to be provided; and

(c) upon request, at points in addition to the network termination points offered to the majority of users, subject to charges that reflect the cost of construction of necessary additional facilities.

2.3 Public availability of the procedures for interconnection negotiations

The procedures applicable for interconnection to a major supplier will be made publicly available.

2.4 Transparency of interconnection arrangements

It is ensured that a major supplier will make publicly available either its interconnection agreements or a reference interconnection offer.

2.5 Interconnection: dispute settlement

A service supplier requesting interconnection with a major supplier will have recourse, either:

(a) at any time or

(b) after a reasonable period of time which has been made publicly known to an independent domestic body, which may be a regulatory body as referred to in paragraph 5 below, to resolve disputes regarding appropriate terms, conditions and rates for interconnection within a reasonable period of time, to the extent that these have not been established previously.

3 Universal service

Any Member has the right to define the kind of universal service obligation it wishes to maintain. Such obligations will not be regarded as anti-competitive per se, provided they are administered in a transparent, non-discriminatory and competitively neutral manner and are not more burdensome than necessary for the kind of universal service defined by the Member.

4 Public availability of licensing criteria

Where a licence is required, the following will be made publicly available:

(a) all the licensing criteria and the period of time normally required to reach a decision concerning an application for a licence and

(b) the terms and conditions of individual licences.

The reasons for the denial of a licence will be made known to the applicant upon request.

5 Independent regulators

The regulatory body is separate from, and not accountable to, any supplier of basic telecommunications services. The decisions of and the procedures used by regulators shall be impartial with respect to all market participants.

6 Allocation and use of scarce resources

Any procedures for the allocation and use of scarce resources, including frequencies, numbers and rights of way, will be carried out in an objective, timely, transparent and non-discriminatory manner. The current state of allocated frequency bands will be made publicly available, but detailed identification of frequencies allocated for specific government uses is not required.