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**THE EU ACTION PLAN : SATELLITE COMMUNICATIONS
IN THE INFORMATION SOCIETY**

Recent activities, present situation and outlook

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SUMMARY

Since the inception of the Satellite Action Plan, in March 1997, the industrial landscape has changed at a rapid pace. Although satellite communications still account for a relatively small portion of the overall telecommunications industry, they continue to grow as rapidly as terrestrial mobile communication systems. Within the satellite industry at large, satellite communications systems account for the biggest part. This paper presents a snapshot of the industrial and regulatory landscape in respect of satellite communications and relates the findings with the actions taken under the Satellite Action Plan with a view to identifying further action.

Evolution of the sector

- The industry is undergoing a process of **consolidation** and **globalisation**. Several manufacturers have merged with each other, but notably also with satellite operators in the recent past. All major international satellite organisations are in the process of adopting fixed timetables for restructuring which should contribute to establish a level playing field between them and private competitors around the turn of the century. A number of low and medium earth orbit systems have or are about to start commercial operations over the next months, while the next generation of satellite broadband systems is still a few years ahead. Most of these consortia are nowadays backed by broad alliances of investors in all continents.
- Satellites are **an essential component of the global communication infrastructure**, together with other means such as optical fibre but offering also unique characteristics. Important issues associated with global reach, and the difficulty of controlling the content, as well as national authorisations, may hamper the development of a much-needed infrastructure. Thus, it is the effectiveness of full competition at EU level together with prospects of removal of market access barriers in other regions as a result of the GATS agreement on basic telecommunications, which should help the satellite industry to expand both within the EU and beyond.

Principles for Commission action

- The Commission, through a number of different initiatives such as the Satellite Action Plan or a planned European Space Industry Forum, has been trying to give **consistent and effective support** to industry through focused actions. The Satellite Action Plan, in particular, has been widely accepted by the industry engaged in satellite communications and led to a series of concerted efforts in order to improve the regulatory framework for industrial development.
- Because of the fact that the area of satellites goes beyond mere telecommunications and involves other service applications, and related industries such as space launch and defence, there are arguments for treating satellites as a 'strategic' industry. Nevertheless, it seems appropriate to work towards **integrating satellite communications into mainstream regulatory policy** on telecommunications, due

to the convergence and increasing competitive relationship between terrestrial and space-based communications systems.

Focus of Commission action

- There is a clear need for more **effective implementation of existing legislation**. This is relevant not only for EC legislation, but also CEPT measures, the application of which is non-binding and non-enforceable by operators. Here, the Commission should exert its influence in order to obtain adherence by Member States if and where Community policies are at stake.
- There is also a continuing need for **improvement of the regulatory environment** at the European (EU and CEPT) level, in order to facilitate **the co-ordinated introduction of global systems in Europe** on a permanent basis and to provide the necessary legal certainty in a timely manner. In particular, the frequency planning and licensing process (European frequency table, authorisation conditions and procedures, one-stop shopping) needs to be pursued vigorously and in a non-discriminatory manner. In certain cases, it is currently still very cumbersome and time-consuming to obtain the necessary regulatory approvals needed for the provision of Europe-wide services.
- The dismantling of **barriers to market access in third countries**, as well as a strengthened support for EU policies in the area of **radio frequencies** will remain high on the list of priorities for the Commission in its external relations and international regulatory aspects.
- Complex satellite communications systems are proposed by industry with a view to providing global or multi-regional access to innovative services. **Research and development** is still essential to provide investors with the necessary confidence in the feasibility of these systems. The complexities of novel systems and requirements for interoperability are also driving R&D requirements towards service demonstration and interoperability trials.
- The EU and ESA Councils agreed on the need to further strengthen the synergy and increase the complementarity between the Community and ESA. ESA and the European Commission are reviewing the possibilities and ways to achieve these goals.

The present paper concludes that a continuation of the actions taken under the Satellite Action Plan is desirable. The key objectives that should guide action are the need to

- consolidate the regulatory environment applicable to satellite communication ;
- contribute to make available scarce resources (spectrum, orbital slots), taking into account anticipated future systems at an early stage ;
- ensure the accessibility of markets in third countries ; and
- support the development of the sector by flanking and co-ordinated R&D measures.

1 INTRODUCTION

The objective of this paper is to present a snapshot of the current industrial and regulatory landscape for satellite communications, and to take stock of the actions taken, both at a regulatory and R&D level, since the initial Satellite Action Plan was launched in March 1997. It will evaluate to what extent and in which areas progress has been achieved, and provide an outlook for further action. It should be read in the context of three ongoing key policy initiatives, namely, the follow-up to the Green paper on Convergence, the Green paper on Spectrum Policy, and the forthcoming 1999 Telecoms Review.

Satellite communications systems have the potential to reach global markets and in fact constitute the wireless global backbone for the establishment of the Information Society. But the deployment of global international satellite systems raises technical and regulatory, as well as economic and political issues, the full dimensions of which can only be addressed at the international level. European interests need to be adequately represented in this context. The importance of satellite communications for Europe has been acknowledged at numerous instances at the highest political level¹.

In March 1997, the Commission issued a Communication on an “EU Action Plan : Satellite Communications in the Information Society”². It outlined a set of priority actions to be undertaken at EU level, and covering (i) the completion of the Internal Market, (ii) the reinforcement of the European position at the international level, and (iii) the reinforcement of EU R&D support and applications development.

The Satellite Action Plan also called upon the Commission to ensure an appropriate interface with industry. An industry group (the so-called “Regulatory Working Group”) has subsequently been established and produced a report³ which contained key messages related to the need for full implementation of EU legislation and CEPT measures by the respective national administrations, as well as the need for

¹ See Communication from the Commission to the European Parliament and the Council on Satellite Personal Communications, COM(93) 171 final, 27.4.1993; Council Resolution of 7 December 1993 on the introduction of satellite personal communications services in the Community, OJ 93/C 339/01; Council Resolution of 22 December 1994 on the further development of the Community's satellite communications policy, especially with regard to the provision of, and access to, space segment capacity, (94/C 379/04, OJ C 379/5, 31.12.94). The European Parliament and Council Decision 710/97/EC of 24 March 1997 on a co-ordinated authorisation approach in the field of satellite personal-communication services in the Community OJ 97/L105/4.

² Communication on the EU Action Plan: Satellite Communications in the Information Society, COM(97)91, 05.03.1997

³ Report by the SAP RWG: Market Access – Problems and Solutions, 15.01.1998 ; see ISPO website at <http://www.ispo.cec.be/infosoc/telecompolicy/en/Study-en.htm>

Commission support to gain market access in third countries. Another report⁴ focussed on the implementation of relevant EC legislation by Member States. A second industry working group has been active in the area of R&D⁵. In addition, the satellite industry also holds plenary meetings at regular intervals, to take stock of current issues and discuss further activities.

⁴ Comments of the SAP RWG on the Commission Third report on the implementation of the telecommunications regulatory package, October 1998, *ibid*

⁵ SATELLITE COMMUNICATIONS - Research and Development Report of the Satellite Action Plan R&D Working Group, April 1998, *ibid*

General overview

The industrial landscape is changing at a rapid pace. Although satellite communications still account for a relatively small portion of the overall telecommunications industry, they continue to see **rapid growth**. Within the European satellite industry at large (i.e. including military as well as other civil applications such as navigation, observation, science and technology), the number of communication satellites to be manufactured until 2002 will constitute approximately 70 % of all systems⁶.

The industry is undergoing a process of consolidation and globalisation. Satellite **equipment manufacturers** are increasingly getting involved in the satellite communications business. The involvement of Hughes in PanAmSat, Loral in Orion, Boeing in Ellipso, Alcatel in SkyBridge, Motorola, Boeing and Matra Marconi in Teledesic, or the purchase of Comsat by Lockheed Martin are some examples of this general trend. Also, the financing base is consolidating. For S-PCS systems in particular, the significant increase of **debt financing** since 1997, as compared to equity provided by strategic investors is evidence of the increasing confidence that finance markets have in the viability of such ventures. Nevertheless, the Asian crisis in 1998, as well as a number of serious setbacks in the business schedule of several major projects have generally led to lower forecasts than those made two years ago.

In Europe, there are currently two major space companies emerging which should shape the developments in the satellite communications market in the years to come. After the consolidation of the space activities of Alcatel, the Aerospatiale satellite business unit, and Thomson CSF under Alcatel Space, with non consolidated sales of 1.4 billion € in 1997⁷, the announced merger of the space activities of Matra Marconi Space, DASA-Raumfahrt-Infrastruktur, Dornier Satellitensysteme and Alenia Spazio, with expected non consolidated sales of more than 2.7 billion € in 1997 will create the largest EU company in commercial space activities, and become a serious challenger to US giants such as Boeing and Hughes⁸.

Developments in some categories of satellite systems :

As far as ‘**big LEOs (or MEOs)**’ are concerned, i.e. non-geostationary low or medium earth orbit systems providing global narrowband voice telephony, Iridium is the first to have launched commercial service in November 1998. The significance of this event can not be underestimated. It has been closely monitored by industry at large, as its success will determine the commercial prospects of many other systems to

⁶ Euroconsult, Space Business in Europe, 1998

⁷ ibid

⁸ see joint press release of DaimlerChrysler Aerospace, General Electric Company, Lagardère and Finmeccanica, 23.12.1998

come. Globalstar and ICO plan to follow in 1999 and 2000 respectively. They are about to start in-orbit deployment, are concluding agreements with service providers and roaming partners and are preparing the process of obtaining licences allowing them to implement their services at a global level. All three companies have a broad international ownership structure, with significant European participation. Other systems such as Ellipso and Constellation will follow later, with a European coverage by 2002 and 2003 respectively.

In addition, regional geostationary systems such as EAST, Thuraya, and AceS, also propose mobile telephony services. In that context, a number of manufacturers including Ericsson, Lockheed Martin and Matra Marconi intend to develop a common access standard for some of these regional systems. Some analysts⁹ are warning that the window of opportunity for these mobile satellite system (MSS) operators is gradually shrinking, as key target markets, such as international business travellers, will be able to choose from a growing number of global communications alternatives by 2004. Cautious projections for growth could lead to about 11 million subscribers world-wide by 2007 (compared to 912 million cellular subscribers anticipated by then), which would consist to a large extent of cellular extensions, followed by international business travellers and other customer groups. Important factors for change that may significantly influence the perspective of the MSS market are :

- competition from 2nd generation mobile infrastructure and possibilities for mobile subscribers to roam between GSM and other types of networks ;
- continued roll out of cellular networks beyond urban areas ;
- introduction of 3rd generation terrestrial mobile systems in 2002 (UMTS) ;
- comparison of satellite with terrestrial mobile terminals : size, weight, battery life ;
- comparison of service offerings for satellite / terrestrial mobile : e.g. GSM data rates will increase to 64 kbit/s from 2000 and will offer packet based services ;
- availability of spectrum: Big Leo systems are competing notably with terrestrial cellular systems for spectrum in the range below 3GHz bands which is particularly congested.
- usage in buildings : cellular operators increasingly encourage the substitution of call traffic from fixed networks to mobile networks. This, and the introduction of cellular home base stations will facilitate the use of mobile handsets in buildings, whereas satellite phone subscribers will need line of sight of a satellite ; and
- cost : Satellite terminals and usage costs, though initially far higher than those of terrestrial systems, will have to bear some relation to cellular tariffs over time, particularly roaming tariffs.

Ironically, while the success of terrestrial cellular telephony has been a major driving force behind these MSS systems, it is the very success of cellular networks, their large

⁹ LEOs, MEOs and GEOs – The Market Opportunity for Mobile Satellite Services, OVUM, 2nd ed., October 1998

coverage and increasing roaming facilities which may invalidate the business plans of some satellite projects addressing the voice telephony market.

Satellite-based, global **broadband and multimedia services** will be launched early in the next decade. They promise to offer fixed high speed internet and on-line services (information and databases, telebanking, video-conferencing, video telephony, entertainment) and infrastructure links for telephony and mobile communications. The planned capital expenditure for all satellite broadband projects announced so far would amount to several tens of billion €. Satellite broadband systems are essential elements for the realisation of regional or global information society projects, e.g. the establishment of Trans-European Networks and Global Information Infrastructures.

As for non-geostationary initiatives, Teledesic remains the most ambitious project and plans commercial start in 2003. Alcatel's SkyBridge initiative is scheduled to start two years earlier, in 2001. Geostationary broadband initiatives can be observed mainly on the two sides of the Atlantic, and include ARCS, EuroSkyWay, Eutelsat, MEDSAT and WEST in Europe, and Astrolink, Cyberstar, EchoStar, KaStar, PanAmSat, and Spaceway in the US. There are also a number of initiatives in the Asian hemisphere.

Satellites are expected to play a major role to offer worldwide access to enhanced interactive broadband communications services, but this will heavily depend on their ability to compete with terrestrial alternatives such as cable. At times they may be a complement to terrestrial infrastructures, while at times competing with them for similar market segments. The development of xDSL, cable modems, standards for interoperability, service prices, as well as market access ('landing rights') and sufficient spectrum resources will be among the key criteria for success.

The upcoming broadband satellite systems are likely to be complementary to terrestrial networks rather than stand-alone systems. The service distribution patterns of broadband systems might be different from those used for big LEOs. Instead of region- or country-specific rights granted to local partners and service providers, new systems will probably be characterised by global distribution rights on a non-exclusive basis.

While it is arguable whether western Europe, due to its rather well developed terrestrial cellular infrastructure, GSM standard and roaming possibilities, will become a key market for big LEO S-PCS systems, it may have more strategic importance for the business perspectives of future broadband systems. Because these systems require huge up-front investments, often several billion € for a single system, legal certainty in the planning phase is therefore essential for all operators.

Another key factor for a successful realisation of broadband satellite systems is the availability of spectrum. The bands foreseen for these systems (Ka and Ku bands essentially) are already used by GSO, FS and BSS systems, and the conditions of sharing the usage of these bands has become an essential matter of global relevance and consequently are currently being debated at ITU/WRC level.

¹⁰ DTT Consulting, Internet via Satellite, 1998

'Little LEOS' are low-cost, low-bitrate, real-time store and forward messaging systems, suitable for asset tracking and monitoring applications. At this stage Orbcomm is the only system ready to offer services at a global level. Others (E-Sat, Final Analysis, LEO One) are expected to follow. Their use of spectrum in the highly congested bands below 1 GHz, as well as compatibility issues with existing terrestrial systems, have been a challenge for regulators in many regions.

On another technological front, **high altitude platforms (HAPS)** are also of importance to Europe. Although not satellites but balloon-like platforms positioned some 20 km above the ground, they plan to provide broadband services at very high bitrates. They will be used for a variety of applications, including internet access, full-motion videophone services for consumers and high-speed networking for business users. From a regulatory perspective, they pose challenges similar to geostationary satellite systems and are usually being discussed in that context. The most advanced project, Skystation, plans its platform deployment in 2000. The project involves major European manufacturers such as Alenia Spazio, which will provide the communications payload, and Thomson CSF that will produce the ground electronics and terminals.

Market data

Analysts forecast an **impressive growth of the overall satellite communication market** for the next 5-10 years. The satellite manufacturing part of the market remains roughly constant, with yearly revenues in the order of 10 billion US\$ worldwide. On the other hand, booming growth is expected in the service provision sector with revenue soaring from about 18 billion \$ in 1997 up to about 150 billion \$ in 2007. Total satellite revenues are expected to reach 75 billion \$ by 2003. Satellite communications will grow from about 2,7 % of total global telecom revenues (i.e. 24 billion \$ out of \$800 billion) to perhaps 5,5% or 75 billion \$ out of a global total of 1.2 trillion \$ in 2005¹¹. Recent statistics show that telecommunications represent the main source of revenues for that industry and that the most important share of the growth is expected from novel systems providing personal communication services and broadband multimedia services. They also indicate the increasingly important role of services.

In the medium-term, particularly high growth rates are expected for the market segment of Mobile Satellite Services (MSS). One report projects that the MSS telephony market will surpass 17 million subscribers worldwide by 2007¹². The Asia-Pacific region is projected to have the largest portion of the global subscriber base for Mobile Satellite Services (35 %), followed by Europe (23 %), Latin America (22 %) North America, and Africa/Middle East (10 % each). China, Brazil, and the U.S. will be the largest national markets.

¹¹ Via Satellite, September 1998

¹² Strategis, World Mobile Satellite Telephone Markets 1999 – 2007 (2nd ed., 1998)

¹³ Booz, Allen & Hamilton, Multimedia Satellite Investment Study (for ESA, in the ARTES 3 context)

Concerning the global market for **satellite based, high-speed multimedia services**, the future market is likely to be large – 30 million subscribers in the year 2005 and almost 50 million by 2010. A study suggests that the biggest market will be Western Europe, followed by North America with East Asia some way behind¹³. The report points to the advantages of terrestrial broadband networks which are likely to offer nearly equivalent bandwidth at lower prices for usage and modem hardware, and with better data latency and superior connection reliability. It concludes that only 3-8% of users would choose a satellite connection if a terrestrial alternative were available. The report also identifies a need for early market entrance, and severe negative cash flow implications for late market entry, as terrestrial alternatives will seize market opportunities.

However, some figures have to be treated with caution, as the planned systems offering either personal communication services or broadband multimedia access continue to face a number of serious technological challenges. These, together with unresolved regulatory issues are risk factors that may influence the financing of planned constellations. Also, the development of terrestrial alternatives, such as the voice telephony and Internet backbone infrastructures, will determine the viability of future satellite projects to a considerable extent.

It is being argued that the growing dominance of those satellite operators currently providing Internet backbone capacity and having footprints that allow interconnection with terrestrial backbone infrastructure in the US, i.e., Intelsat, followed by Orion and PanAmSat, gives them a strong base from which to leverage their position into the next generation of satellite technology specifically designed for Internet - the Ka-band and V-band multimedia satellites -, while the rest of the world's satellite operators are left with the less certain and smaller market for Internet based data broadcasting and highly asymmetrical DirecTV type services¹⁴.

¹⁴ DTT Consulting, Internet via Satellite, 1998

¹⁵ negotiated among ITU members every 2-3 years at World Radiocommunication Conferences (the next one to be held in spring 2000, in Istanbul)

3 REGULATORY ENVIRONMENT IN EUROPE

The regulatory landscape in Europe has changed significantly over the last two years. There are several parallel layers of regulation in a rather complex constellation of competencies and activities : besides regulation at global level (spectrum allocations under the framework of the ITU¹⁵ on one side, and the GATS¹⁶ trade framework on the other), regulatory aspects in Europe are dealt with both by the CEPT¹⁷ and the EU.

Below are some indications on the main elements of regulatory policy with relevance for the satellite sector. As far as the present state of implementation of EU legislation is concerned, the third¹⁸ and fourth¹⁹ reports of the Commission on implementation of the telecommunications regulatory package give further details. They may not give the full picture of all satellite-related regulatory measures, however, as some areas (such as in the S-PCS context, see below) are only being initiated at EU level, but implemented by CEPT measures. Industry has commented critically on the implementation process and raised concerns that delays and lack of implementation, in particular of CEPT decisions and recommendations, resulted in insufficient regulatory certainty²⁰.

3.1 Licensing of satellite systems

The Licensing Directive

In force since 1 January 1998, the Licensing Directive²¹ provides the general framework within which authorisations and licenses may be granted by national administrations to applicants wishing to operate telecommunications networks or to offer telecommunications services in the EU. Among its most relevant elements, the following should be mentioned in this context :

- conditions imposed on applicants have to be objectively justified, non-discriminatory, proportionate and transparent (Article 3 (2)) ;

¹⁶ Agreement on Basic Telecommunications, in effect since 5.2.1998, and a 'reference paper' with detailed market access commitments

¹⁷ Conference Européenne des Postes et Telecommunications, an intergovernmental organisation across Europe, at present composed of 43 European national administration

¹⁸ of 25 February 1998, COM (98) 80, see www.ispo.cec.be/infosoc/telecompolicy/

¹⁹ of 25 November 1998, COM (98) 594 (same reference as above)

²⁰ published in October 1998, at <http://www.ispo.cec.be/infosoc/telecompolicy/en/Study-en.htm>

²¹ Directive 97/13/EC of 10.4.1997, O.J. L 117/15 of 7.5.1997

²² Francovitch and Bonifaci (C-6/90 and 9/90), judgment of 19.11.1991 (Rep. 1991, I-5357); Brasserie du Pêcheur and Factortame (C-46/93 and C-48/93), judgment of 05.03.1996 (Rep. 1996, I-1029); British Telecommunications (C-392/93), judgment of 26.03.1996 (Rep. 1996, I-1631).

- national administrations have to grant authorisations within a specific timeframes (six weeks under normal circumstances, four months in specified cases, eight months in the case of comparative bidding procedures), thus establishing legal certainty and timely regulatory responses to commercial propositions (Article 9) ; and
- this applies equally to new services for which applicants may request a provisional authorisation within six weeks (Article 19).

Member States may therefore attach necessary safeguards to their licences that must be proportionate and in line with the provisions of the Licensing Directive. In most circumstances, refusal to grant a licence would normally not be considered appropriate.

To the extent that the Licensing Directive establishes specific rights for operators at the EU level, a refusal to grant an authorisation in an appropriate manner can be challenged by the applicants. Under the doctrine of direct effect developed by the European Court of Justice with respect to Community Directives, companies which are confronted with a refusal to grant licenses pursuant to Directive 97/13/EC may seek damages in national court proceedings in case of either lack of transposition, incorrect transposition or inadequate application of Community law provisions²². In addition, they may ask the Commission to initiate an infringement procedure against the respective Member State(s).

The relationship between service licence and frequency assignment, and the treatment of these two aspects by Member States, will be of particular relevance for satellite systems in that context. The Commission will also continue to closely monitor the progress made in the harmonisation efforts for authorisation conditions, as foreseen in Article 12 of the Licensing Directive, as well as the interpretation of such conditions if there were to appear important divergences across the EU

One-stop shopping

The Licensing Directive foresees the establishment of a one-stop shopping mechanism. So far only a few Member States (France, Germany, Netherlands and UK) and Switzerland have entered into an agreement - predating the Directive - to apply a one-stop shopping procedure for the granting authorisations of certain satellite services such as VSAT²³ and SNG²⁴. Already since summer 1997, the CEPT has been mandated by the Commission to develop satellite-specific rules for a one-stop shopping procedure for satellite authorisations across Europe, pursuant to Article 13 of the Licensing Directive. Although such a mechanism would seem to be particularly appropriate for satellite systems which, by their very nature, provide regional if not global coverage, there has been quite some debate among European administrations

²³ Very Small Aperture Terminal (small earth stations for one- or two-way private communications)

²⁴ Satellite News Gathering (using transportable earth stations)

about the added value of any such mechanism. While regulators generally are wary of foregoing ultimate control over the authorisation mechanism for their respective territories, the satellite industry has, at times, commented that a mere 'letter box' mechanism might not have the desired effect of simplification but could risk establishing yet another layer of procedure.

Work in CEPT is in progress and should cover all aspects related to satellite network operators, service providers and subscribers of small fixed earth stations or other mobile terminals. It is expected that the future mechanism would comprise a common database and provide common application forms for applicants. It will potentially cover fixed, mobile and broadcasting satellites, and could be in place before the year 2000.

Conditions and license fees

Regulation at European level remains sketchy. Even though the first experiences under the S-PCS mechanism are still fresh and need to be analysed further, it seems that a compelling case for harmonisation of **licensing conditions** could be made for satellite systems in general. Article 12(1) of the Licensing Directive foresees harmonisation measures only in the context of general authorisations. But to the extent that satellite systems tend to be authorised by individual licenses rather than general authorisations in many Member States, often covering frequencies usage authorisation and service license provisions by a single regulatory act, they do not enjoy the benefit of harmonised authorisation conditions and procedures throughout the EU although these systems would arguably be the ones most suited for further harmonisation measures.

Matter such as these will be part of the discussions that will lead up to the review of the Licensing Directive, as part of the 1999 Telecoms Review. Also, other questions related to the interpretation of certain provisions of the Licensing Directive are being discussed in the Licensing Committee among all Member States, with representatives from CEPT (ERC, ECTRA, ERO, ETO) present as well.

As for **license fees**, the Licensing Directive suggests that fees imposed on undertakings as part of authorisation procedures should only seek to cover the administrative costs incurred, in the issue, management, control and enforcement of the applicable individual licenses. Fees for individual licenses shall be proportionate to the work involved (Art.11 (1)). In addition, for individual licenses Member States are free to impose charges that reflect the need to ensure the optimal use of these resources (Art.11 (2)). In this context, three issues may need to be considered further :

- There seem to be, in some cases, considerable discrepancies in the license fees imposed by various Member States in their respective authorisation mechanisms even when these are being applied to comparable systems and/or services.- To the extent that one-stop shopping mechanisms are being put in place in order to facilitate the procedures both for applicants and national administrations, an adequate way of funding such mechanisms must be found, e.g. via filing charges raised from applicants or by contributions from participating administrations.

- A spectrum auction for S-PCS in one or more Member States, though possible under the terms of the Licensing Directive, would raise problems if it were to be applied to frequency bands assigned in a harmonised manner across Europe for pan-European systems such as S-PCS. In contrast to terrestrial cellular infrastructures which are mainly rolled out alongside national boundaries of Member States and can adapt their business concepts to the respective conditions of entry, the development of pan-

European services such as S-PCS could be seriously hampered. For the time being, though, there seem to be no specific proposals to this end.

Legal Interception

The issue of interception of telecommunications is relevant for satellite communications, as many of the modern global constellations do not necessarily need gateways on the soil of all or, indeed, any EU Member State. This means that Member States need to rely on the co-operation of the network operator and, possibly, the authorities of other countries in which the system may have terrestrial gateway stations, in order to get access to specific communications it wishes to intercept. While this matter is outside the scope of the Licensing Directive²⁵, failure to resolve the issue could have grave consequences for the deployment of such constellations, because the lack of legal certainty could jeopardise certain business plans. The matter raises difficulties on principles as well as practicalities, and has revealed legislative grey areas. One aspect is the question how to reconcile legal stipulations falling under the 3rd pillar (notably the 1995 Council Resolution of 17 January 1995 on the lawful interception of telecommunications) with legislation established under the 1st pillar (such as the Directive on data privacy). Another aspect is the practical implementation and related legal problems in cases where a national request for interception can only be met through network equipment based in another country.

3.2 Co-ordinated introduction of satellite systems

The Council and European Parliament Decision on S-PCS²⁶ (the “S-PCS Decision”) aims at facilitating the rapid introduction of compatible satellite personal communications services in the Community through the harmonisation of frequency bands and usage conditions attached to general authorisations as well as to remove remaining barriers to the free movement of terminal equipment. The creation of conditions for the harmonised introduction of S-PCS services throughout the EU, and beyond, is to be achieved by way of mandates to the CEPT. One of the main arguments of this approach was the pan-European coverage that CEPT could provide.

Based on the S-PCS Decision, the Commission mandated the CEPT to adopt appropriate measures concerning (i) the harmonised use of frequencies, (ii) the harmonised conditions attached to general authorisations, (iii) the free movement of terminal equipment in the Community, and (iv) harmonised authorisation procedures for big LEO systems.

²⁵ “The list of conditions which may be attached to authorisations is without prejudice to [...]measures taken by Member States in accordance with public interest requirements recognised by the Treaty, in particular Articles 36 and 56, specifically in relation to [...] public security[...]” (Annex to the Licensing Directive, last par.)

²⁶ Decision 710/97/EC of 24 March 1997, O.J. L 105/4 of 23.4.1997

In reaction, ERC and ECTRA adopted four decisions²⁷ leading, inter alia, to the establishment of a Milestone Review Committee (MRC). The MRC screens applicant systems and determines whether they have reached certain milestones. This is communicated to the national administrations by way of recommendation. As soon as an applicant system has provided evidence of the first successful satellite launch and in-orbit deployment, administrations are to proceed with frequency assignments and the authorisation procedures²⁸.

The primary motive of this mechanism was the concern to distinguish, in an open and transparent manner, real commercial propositions from 'paper satellite' systems. During the process, it became apparent that the MRC had an additional and important role to play in relation to additional regulatory problems, such as interference issues for which a common standpoint by all administrations concerned had to be found.

This mechanism has been in operation since autumn 1997 and generally been found to be rather helpful. The MRC has dealt in a speedy and effective way with its tasks so far, i.e. the scrutiny of milestones with respect to several applicant systems. However, it has not yet been tested on a key task that would consist of deciding on spectrum usage where the aggregate spectrum demand of applicants having passed the milestone procedure before the year 2001 exceeded the spectrum available.

While the mechanism has so far concerned only 'big LEOs', the Commission has issued further mandates to CEPT with respect to other low-orbit systems in other bands (e.g. for Little LEO systems). They should lead to further CEPT decision(s) in the coming months. CEPT is currently working to ascertain whether and how milestone review mechanisms might be applied to future candidate systems in other bands in a broader sense, i.e., possibly covering mobile, fixed and broadcast satellite systems, both geostationary and non-geostationary.

Despite these overall positive developments, a number of critical remarks can be made on the present overall approach described above :

- the S-PCS Decision established a mechanism under which the European Commission does not have direct control about the effective implementation, by the Member States, of the measures decided. This is important as the failure, by some Member States, to

²⁷ ECTRA Dec. of 3.7.1997 on harmonisation of authorisation conditions and co-ordination of procedures in the field of S-PCS in Europe, operating within the 1.6/2.4 and 1.9/2.1 bands (ECTRA Dec.(97)02 ; ERC Dec. of 30.6.1997 on the harmonised use of spectrum for S-PCS operating within the 1.6/2.4 and 1.9/2.1 bands (ERC Dec.(97)03) ; ERC Dec. of 30.6.1997 on the Transitional Arrangements for the Fixed Service and Mobile Satellite Service in the 1.9/2.1 band in order to facilitate the harmonised introduction and development of S-PCS (ERC Dec.(97)04) ; and ERC Dec. of 30.6.1997 on free circulation, use and licensing of mobile earth stations of S-PCS (ERC Dec.(97)05).

²⁸ ERC/DEC(97)03 specifies (decides 6) that ... "for an S-PCS system which meets all milestones up to and including milestone 6 [...], and which becomes operational and ready to provide commercial service within the CEPT prior to 1 January 2001, its MES [i.e. Mobile Earth Stations] may operate on a provisional basis, subject to national authorisation in the relevant administration which may be conditional on the outcome of frequency co-ordination with other services in that country, [...]" (emphasis added)

sign and implement all the relevant ERC and ECTRA decisions would jeopardise the single market objective for these kind of services.

- the wording of the present ERC decisions established in the context of mandates under the S-PCS Decision (in particular ERC Dec.(97)03 (decides 6)) leaves the possibility open that no licences would be granted at all if frequency co-ordination was to fail in one country. In the absence of a mechanism to resolve the issue, there is an inherent risk that frequency harmonisation across Europe for the services in question may not be achieved.

- some Member States have no domestic mechanisms to comply with the relevant provisions of the ERC decision, in particular the possibility to grant licences and/or assign frequencies on a provisional basis. This could become problematic if spectrum scarcity would lead the MRC to revise the situation, and the inflexible nature of some of the national authorisation schemes would become apparent.

- the 'pan-European effect' of the CEPT, with its larger number of participating administrations compared to the EU, may be questionable since very few European countries outside of the EU have chosen so far to commit themselves to the above decisions.

3.3 Standards, Terminals, Type Approvals

The ETSI Satellite Earth Station Working Group is developing standards for satellite terminals, which are regularly enshrined in Community legislation as so-called Common Technical Regulations (CTRs). To date, seven satellite-specific CTRs have been adopted by the Commission²⁹.

Furthermore, since S-PCS services are to be provided at a global level, work following the ITU World Policy Forum of 1996 resulted, in March 1998, in the set-up of a **Memorandum of Understanding on GMPCS** (Global Mobile Personal Communications Services, which comprises S-PCS) to address international regulatory issues, such as type approval and marking, terminal licensing, access to traffic data, and customs issues.³⁰ Under this MoU, the ITU Secretary-General is to act as depository for the arrangements and all related instruments and information, as registry of terminal types once they have been granted type approval. In addition, the word 'ITU' may be used as part of the GMPCS MoU mark, and should facilitate circulation and use in all territories of the signatories to the MoU.

²⁹ see <http://www.ispo.cec.be/infosoc/telecompolicy/typeappr/>

³⁰ The benefits of GMPCS will be fully realised when a significant number of administrations offer the necessary authorisation for service provision and access to spectrum. At the end of 1997, 74 administrations, organisations and companies have signed the GMPCS MoU. There is a need to ensure that the arrangements proposed in the GMPCS MoU are compatible with Community legislation.

The most important development at Community level is the **R&TTE-Directive**³¹. In essence, the new Directive will abolish existing community-wide³² or national type approval regimes, remove *a priori* market controls by introducing a system based on manufacturer's declaration and surveillance, and relax the regulatory requirements for the free movement and putting into use of terminal equipment. The scope of the Directive will include many classes of equipment, not covered by CTRs under the present regime. The new Directive will no longer be based on mandatory specifications.

A committee will assist the Commission in the implementation of the Directive. A total of four informal *ad hoc* groups have started to investigate various aspects, such as interface notification (pursuant to Directive 83/189/EEC), the establishment of equipment classes, optional essential requirements, market surveillance. In addition, ETSI Task Group 6 will be mandated to develop a work programme on the development of standards to become harmonised standards in accordance with the R&TTE Directive.

3.4 Competition - and the reform of international satellite organisations

Within the EU, the Directive 94/46/EC³³ on the liberalisation of satellite services had already introduced the principle of direct access to space segments of international satellite organisations and the possibility of multiple signatories in 1994. In the US, this process has also been initiated by the FCC with a rulemaking³⁴ that could result in direct access to the Intelsat system in the US, rather than through Comsat, the US signatory to Intelsat.

Three of the major international satellite operators with an impact on Europe (Intelsat, Inmarsat and Eutelsat) are intergovernmental treaty organisations. They currently number 143, 84 and 47 member countries respectively. The signatories of each country, often the incumbent national telecoms provider, own a share in the organisation proportional to its usage of the overall system. At present, the signatories also act as distributors of the services to final customers or to sub-distributors.

Their restructuring plans are progressing under continuous review by the Commission. All three have, to a varying degree, engaged in internal discussions on restructuring reform, aimed at transforming the operating parts into public companies, possibly to be followed by public offerings of shares. Over time, these spin-offs should enjoy no privileged position on the market anymore (immunities from competition and other

³¹ Radiocommunications and Telecommunications Terminal Equipment Directive (final adoption of Commission proposal COM (98) 692 expected in early 1999).

³² e.g. Directive 98/13/EC

³³ Commission Directive 94/46/EC of 13 October 1994 amending Directive 88/301/EEC and Directive 90/388/EEC in particular with regard to satellite communications, O.J. L 268, 19.10.1994

³⁴ report No. IN 98-55, IB Docket 98-192, dated 22.10.1998

regulatory schemes, tax exemptions etc). The commercial operations will have to be run at arm's length from the current signatories' assemblies. Also, it is expected that the public participation in these operations will be diluted over time, thus reducing the possible conflict of interest between the former signatories' role and their role as distributors of services.

Intelsat's Assembly of Parties unanimously approved, in April 1998, the creation of an independent spin-off company called New Skies Satellites N.V. and incorporated in the Netherlands. Following a structural separation between New Skies and Intelsat, New Skies will be subject to the regulatory bodies of every country in which it may operate and will have no privileges or immunities. Intelsat ownership in New Skies will be set at 10 % and the ownership will be held in a non-voting trust; the maximum level of individual investor ownership in New Skies will initially be set at 17 %; the initial shareholder ownership in New Skies will be diluted over time, through a public offering of shares (IPO) to begin with. Safeguards will assure fair competition.

However, only about a quarter of the total fleet is to be transferred from Intelsat to New Skies, for the time being. It is expected, therefore, that this is only a first step, to be followed by further moves towards full commercialisation. Decisions are expected over the coming months, and the solutions could possibly be modelled along the lines already taken by Inmarsat.

Inmarsat's restructuring plans were recently approved by the Commission³⁵, and endorsed by the Parties³⁶. Following the restructuring, Inmarsat will be constituted as a public company and the signatories will become shareholders. It is envisaged that there will be a public offering of shares (IPO) within two years of the restructuring. Though behind Intelsat as far as the schedule is concerned, Inmarsat is planning for a total separation under which the intergovernmental part would retain only a number of control functions related to maritime and aeronautical safety and distress systems.

Eutelsat has also set up a joint reflection group. Present plans foresee the set-up of a commercial spin-off by 2001 at the latest³⁷. In May 1999, the Assembly of Parties will decide on the final adoption of the restructuring proposal which foresees the creation of a new company (Société Anonyme S.A.) taking over the satellite fleet, as well as the spectrum and orbit asset of Eutelsat, responsible for its commercial activities and bound to be open to non-signatory shareholders. The new company will be only loosely controlled by the former signatories as for basic ensuring public/universal service, pan-European coverage of operations, non-discrimination, and fair competition).

³⁵ negative clearance, case IV/36.442, see press release IP/98/923 dated 22.10.1998

³⁶ at the General Assembly, in November 1998

³⁷ Assembly of Parties, Estoril, Mai 1998, see Eutelsat press release CP/10/98 of 18.5.1998

4 ACCESS TO THIRD COUNTRIES AND THE GLOBAL DIMENSION

The Satellite Action Plan highlighted a set of actions to be pursued in order to achieve a reinforcement of the European position at international level. Those actions were addressing the following issues:

- market access barriers affecting the satellite communications market both in the specific context of the WTO implementation and in the more general context of trade policy with all our trading partners ;
- trade and economic issues related to orbits and frequencies, including the European strategy in the ITU sectors ; and
- opportunities arising from increased co-operation between EU and third countries including the US, Russia, Canada, Japan and developing countries.

4.1 Market access barriers

The WTO basic telecommunications agreement has been in effect since 5 February 1998³⁸. It enshrines the principles of full liberalisation and market access for service providers from all WTO countries. Almost all OECD countries and many newly industrialised and emerging countries provided comprehensive market access and national treatment commitments with immediate binding effect. Other countries offered staged access to their markets over the coming years.

Broadcasting

The agreement also covered big and little LEOs, as well as multimedia satellite systems. However, a majority of countries is either not party to the agreement or has made exemptions to the market access commitments. Broadcasting services, such as Direct-to-home, Digital Broadcasting Services and Digital Audio Radio are specifically exempted. This absence of an agreement covering broadcasting threatens to hamper the commercial viability of future Internet-like multimedia services via satellite.

The MFN exemptions on DTH and DBS taken by the most important northern and southern American countries (e.g. US, Canada, Brazil, Mexico, Argentina) affect trade with the European Union while the competitive disadvantage for European companies is increasing with the bilateral reciprocity agreements already concluded by the US Government with Mexico and Argentina.

³⁸ Agreement on Basic Telecommunications, in effect since 5.2.1998, and a 'reference paper' with detailed market access commitments

³⁹ Most-favoured-nation clause, a WTO principle requiring contracting parties to grant a treatment no less favourable than that granted to other trading partners

Market access for mobile satellite systems

As for MSS, only 39 contracting parties to the WTO made market access commitments (all Inmarsat signatories), and only 50 out of the 143 parties to Intelsat (accounting for 80% of shares) made full or partial commitments⁴⁰.

At this stage, there are issues with regard to potentially discriminating or lengthy procedures for access to the necessary frequency bands or authorisation for new systems in the US market. In the case of ICO in particular, the Commission has been expressing concern about this case for over one year, and has engaged the US authorities in technical and trade consultations with a view to reaching a satisfactory solution as soon as possible.

Attempts of unilateral legislation by the US

The US bills introduced during 1998 concerning the restructuring of Intelsat and Inmarsat⁴¹ could become another area of concern, if legislative plans to link the restructuring plans of these organisations to market entry in the US were to proceed. This would risk having a negative impact on the shareholder interests of these organisations, a considerable part of which would affect EU Member States or undertakings. The takeover of Comsat (the US signatory to both Intelsat and Inmarsat) by Lockheed Martin, in summer 1998, has given an additional spin to the developments, requiring FCC approval and a change in the 1962 Communications Satellite Act which provides for a 10% shareholder cap for any single investor. At this stage, however, it is unclear how the debate in the US Congress will develop.

Efforts for implementation

For the moment the Commission is focusing primarily on effective implementation of the agreement by the major trading partners of the European Union. In this context, the dialog with industry and more specifically the SAP Regulatory Working Group is proving to be a very useful complement to the assessment, made by the Commission, on the regulatory situation in third countries and is helping to develop, where appropriate, co-ordinated views on global policy issues.

The Regulatory Working Group is constantly providing the Commission with information on market access barriers in third countries. This is being processed into a Commission database containing market access barrier fiches (public documents) and country fiches (internal documents). This database is a key instrument for trade negotiators of the Commission when trying to lift those barriers in bilateral trade negotiations. It is used (i) for accession negotiations to assess the changes that are necessary within candidate countries' regulatory frameworks, and (ii) for implementation reviews, where the Commission checks how effectively signatories abide by their commitments, and how detrimental exemptions are. Ultimately, this

⁴⁰ DTT Consulting, *Internet via Satellite*, 1998

⁴¹ 'Bliley-bill' (H.R.1872, the International Satellite and Privatization Act of 1998), and 'Burns-bill' (S. 2365, the International Satellite Communications Reform Act of 1998)

information may form the basis for formal WTO proceeding by the Commission where failure to implement the agreement results in significant market access barriers.

4.2 Orbits and frequencies – the ITU context

The WRC 97 exemplified the changing nature of negotiations in ITU from a technical to a more commercially oriented one. As a consequence, the Commission is now closely monitoring the preparation of WRCs and assesses their impact on EU policies. Satellite technology which facilitates the cross-border provision of telephony, television, radio, and multi-media services is an important enabler of the development of the information society in Europe, and as such must be taken into consideration when elaborating European Common Positions for WRC 2000. In a Communication⁴² issued in early 1998, the Commission assessed the main results of WRC97, indicated key areas of interest for WRC 2000 and explained the consequences of European policies on the definition of European positions for WRC 2000.

Spectrum frequencies are finite resources, and are vital for the successful deployment of future initiatives. The WRCs in 1995 and 1997 took important decisions for the provision of satellite-based broadband services, which will allow for high-speed Internet access and video conferencing. System filings (both at ITU level and at the US FCC) have gone beyond Ka-band (18-30 GHz) where between 10 and 20 systems are heading towards commercial realisation early in the next century. Already in late 1997, the US FCC accepted filings for future systems in the V-Band (36-52 GHz) including, inter alia, Pentriad, GE Starplus, GS-40, Expressway, Spacecast, Starlynx, Cyberpath, Mstar, Orblink, Aster and V-Stream.

Similarly under several important headings, WRC 2000 will address frequency requirements for the provision of services, including voice telephony, and broadcasting, by means of satellites. This includes satellite broadband services and fixed satellite services including high altitude platforms. Satellites are also an important infrastructure component for the introduction of digital television and radio services in Europe⁴³ and lead to an expanding demand for audio-visual products.

However, as the commercial value of spectrum increases, the negotiations necessary to obtain it become more intensive. Europe has still difficulties to crystallise its views in a timely and efficient manner. This allows other partners to drive the agenda of international negotiations in many instances.

As for orbital slots, the decisions adopted at the ITU plenipotentiary conference in Minneapolis, in November 1998, on administrative cost refunding, in addition to the tightened 'due diligence' rules adopted at WRC 97, should have some impact on the

42 Radio frequency requirements for Community policies in context of the World Radio Conference, see <http://www.ispo.cec.be/infosoc/telecompolicy/en/Study-en.htm>

43 The market for European audio-visual products is estimated to be worth 54 billion € in 2005 (as compared to 32 billion € in 1995). Community funding for the introduction of advanced television services amounted 228 million € in the period 1993-1997. In order for the European market for audio-visual products to further develop, sufficient availability of frequencies needs to be secured.

congestion effects created by ‘paper filings’ over the last years. It remains to be seen whether they are sufficient or whether the calls for a broader ‘financial due diligence’ by a number of countries will lead to further reforms.

4.3 International Agenda and co-operation with third countries

The Commission regularly provides the satellite industry in Europe with a schedule of relevant international meetings so that they can provide appropriate background material in due time on matters of particular concern, be that to the industry at large or for specific companies in a particular case. This has resulted in an increased co-ordination between industrial, administrative and political initiatives. As a result, the industry is now routinely associated with the preparation of meetings with authorities from third countries, including, but not limited to, the Transatlantic Economic Partnership, enlargement and co-operation negotiations with Eastern European countries or trade agreements with Mercosur, Chile and Mexico. Within the context of the future convention between the EU and ACP (Africa, Caribbean, Pacific) countries, it is foreseen, whenever possible, to launch initiatives aimed at encouraging EU-ACP business links and fostering EU-ACP economic partnerships through various forms, such as a regular high-level dialogue, investment promotion activities, participation in technical assistance operation, definition/adoption of standards, etc.

European industry has fully understood the challenges of the global information society and is carefully considering its options in many emerging and developing countries and has demonstrated a keen interest in being supporting several initiatives such as forthcoming trade negotiations with Mercosur and other Latin America. Similar negotiations with China, the Russian Federation and the New Independent States would further enhance the ability of European industry to consolidate and improve its market positions in these countries. In addition, regulatory seminars with officials from third countries are organised in the context of Phare and Tacis programmes.

The Commission’s proposal to enhance co-ordination at international level regarding electronic commerce and access and use of the Internet is relevant in this respect⁴⁴. It aims at ensuring that appropriate political decisions and recommendations are taken to support the development of global markets and resolve potential international disputes in the field of IPR and recognition of data security and privacy issues.

Industry supports and contributions to several recent Commission’s initiatives have proved to be beneficial. It is envisaged to pursue this effort and to ensure that there is a clear and transparent mean for the satellite communication industry to be aware and consequently to contribute to and to support Commission’s initiatives in third countries.

⁴⁴ See Commission proposal COM (98)586 of 23.11.1998 for a Directive on certain legal aspects of electronic commerce in the internal market; and Commission proposal COM (98) 297 of 13.5.1998 for a Directive on a common framework for electronic signatures

5 RESEARCH AND DEVELOPMENT

Research and Development in the field of satellite communications is primarily supported by national space agencies and the European Space Agency (ESA). The situation in this field is however evolving rapidly, notably because of the success of satellite communication as a commercial reality.

Direct R&D support to satellite communication used to be sponsored through the development of advanced communication satellites launched on an experimental basis such as, e.g., the Artemis program from ESA (to be launched in 2000, and involving costs around 700 million €) or the ACTS program of NASA. However, this approach is today progressively abandoned, because of the high cost it entails, the alternative possibility of on-ground testing, and the maturity reached in certain technological developments. Neither ESA nor NASA have plans for any follow up of these programmes.

At present there are only a few countries still planning to launch advanced communication technology demonstrator satellites, such as Japan (Experimental and Test Satellite series) and France (Stentor satellite, launch planned for 2000). In this context of diminishing R&D support by space agencies to the satellite communication sector, industry is playing an increasingly active role in directly developing the needed technologies for commercial initiatives.

However, indirect support to the satellite communication sector remains high in the US, with support to technology developments and programmes from which industry benefits by technology transfer. A particular case concerns the developments of next generation GPS (block III F), programmes such as the New Millennium, or military programmes by the Department of Defence which have no real equivalent in Europe. Eventually, this situation may put European industry at a competitive disadvantage.

The new satellite communications systems today proposed for the provision of advanced services in a global or multi-regional context are significantly more complex than the traditional GEO systems used for TV broadcasting or point-to-multipoint data transmissions. Early service demonstrations and interoperability with terrestrial networks are also becoming key elements to favour investor's confidence in the overall technology maturity. The US ACTS technology demonstrator has been used to extensively support such trials. However, with tens of billion € required to finance all proposed multimedia systems and only a fraction of the needed investment volume raised to-date, it can be inferred that confidence in the technology is not yet there and that potential investors continue to scrutinise technological developments before making decisions. In that context, support to R&D remains a key issue and the currently deployed S-PCS systems, with a high level of technological complexity, will be considered as a reference point.

Against this background, the Satellite Action Plan identified the need to conduct R&D actions, notably for pre-normative research in the area of a multi-mode (terrestrial-satellite) user terminal for broadband satellite mobile applications, and in a way which would be complementary to the programmes of national space agencies and ESA.

In order to assist in the accomplishment of these actions, a satellite working group (SWG) has been set-up by the Commission under the Satellite Action Plan. The SWG is composed of senior representatives of industry, space segment operators, traditional operators, national space agencies and ESA.

5.1 Co-ordination of work with Space Agencies and Member States

The SWG has been working with the objective of identifying R&D actions best addressed under Space Agencies work programs and those areas where the 5th Framework Program (FP)⁴⁵ would provide significant added value. Its report⁴⁶ outlines (i) the R&D priorities in the satellite communication sector at large, (ii) the actions to be preferably addressed by Space Agencies, especially for specific satellite technologies developments, (iii) the actions suitable under the FP, in particular in the field of full scale systems validation, services and application trials and (iv) an overview of related R&D in other regions (US and Japan).

This report has been well received by industry at large as well as ESA. It represents a solid basis for the preparation of the “Information Society Technology” (IST) work programme of the 5th FP. The total budget for the 5th FP will amount to 14.96 billion €, of which 3.6 billion will be devoted to the IST programme⁴⁷. Specific satellite communication work is currently planned under Key Action 4 of the IST Program. Key Action 1 may also trigger service demonstration activities using satellite technology, while Key Actions 2 and 3 may generate some interest from satellite communication-based proposals, although the link is less obvious.

Progress in the field of R&D developments in the sector are regularly reported to the Space Advisory Group, a group chaired by the Commission and attended by representatives of Member States and of Space Agencies, including ESA.

In the field of satellite communications, co-ordination with ESA has been achieved through regular exchange of information. In particular, the ARTES 3 program of ESA has been analysed by Commission Services with a view to avoiding unnecessary duplication of work. The ARTES 3 program includes (i) support to space technology, (ii) support to medium term initiatives of European space industry (Skybridge, WEST and EuroSkyWay), and (iii) support to demonstrations and trials. The 5th FP, on the other hand, provides industry with an instrument to catalyse market take off in the downstream sectors (terminals, services and applications) and allows to generate partnership and synergy between the space community and the terrestrial community, such as traditional operators, service providers and users. The FP naturally involves all

⁴⁵ see <http://www.cordis.lu/fifth/home.html>

⁴⁶ of April 1998, see <http://www.ispo.cec.be/infosoc/telecompolicy/en/Study-en.htm>

⁴⁷ The IST program contains the four following Key Actions : Systems and Services for the Citizen, New Methods of Work and Electronic Commerce, Multimedia Content and Tools, Essential Technologies and Infrastructures.

these players and allows for international co-operation, whilst ESA programmes are more focussed on the traditional space community.

Moreover, ESA and EU Councils have adopted a joint Resolution⁴⁸ stressing the need to further strengthen the synergy and increase the complementarity between the European Commission and ESA. Planned actions in 1999 include a Joint Report on synergy between the EU and ESA in space activities, as well as a document on a European Policy for Space.

5.2 R&D Actions up to now

Following the adoption of Satellite Action Plan, specific initiatives in the field of R&D for satellite communications were launched under ACTS and IT specific programs in the (old) 4th FP.

ACTS, which accounted for 35 million € of Community contribution in the sector before the third call, has retained a set of new projects bringing the overall ACTS budget dedicated to satellite communications to about 50 million €, roughly 8% of the overall budget of the programme. A large part of the work is directly applicable to advanced satellite constellations providing multimedia services and a large number of projects have been benefiting from participation by ESA. The main topics addressed through ACTS actions include

- second generation S-PCS (S-UMTS) : Service trials (MPEG4), interoperability with terrestrial UMTS, interoperability between multiple space segment providers;
- interactive multimedia systems : Ka-band service demonstrations, mixed Ku/Ka systems using DVB, interactive SMATV systems, end-to-end demonstrators using on-board processing;
- ATM compatibility through integration with B-ISDN signaling and network management;
- IP over ATM via satellite; and
- digital HDTV broadcast, broadband infrastructures supporting ACTS trials etc.

ESPRIT, the information technologies (IT) programme, is an integrated programme of industrial R&D projects and technology take-up measures. It has reached an overall budget dedicated to satellite communications of approx. 15 million €. Main topics addressed in ESPRIT actions relating to satellite communications include development of components, software tools and demonstrations of value added services.

In total, the 4th FP contribution to satellite communications currently amounts to about 65 million €, which corresponds roughly to the size of the first phase of the ESA ARTES 3 programme in support to multimedia constellations.

⁴⁸ Resolution 9830/98, adopted at the EU Research Council of 23.6.1998, and by the ESA Council on 30.6.1998

The **Telematics Application Programme** uses satellite communication to develop and demonstrate innovative services. Some 20 million € have been contributed to applications in several sectors. In Education and Training, the use of satellite communications supports interactive television (digital), video-conferencing using VSAT and direct internet through satellite. In the field of health telematics, emergency management applications address maritime users and remote communities. In transport, satellite communications are used for freight tracking and fleet management, as well as for communicating weather, commercial and digital map data among maritime users.

Finally, **TEN-Telecom**, an initiative which supports pilot projects which has provided a valuable complement to R&D actions. With an overall budget of 147 million € for 1995-99, its aim is to support the development of telecommunications networks, and to promote the implementation of trans-European telematic applications of collective interest based on interoperable generic services and on interconnected digital networks. TEN-Telecom devoted 40% of its 1998 budget to applications development of satellite projects. The first call in early 1998 had a total EU funding of 8.4 million € among which 6.7 million € were for activities supported by satellite and mobile networks.

Support to terminal developments and standardisation –Satellite UMTS

In the field of standards for broadband multimedia systems, industry has taken the lead and submitted a project to ETSI. Standards are thus currently elaborated by ETSI for first generation interactive broadband terminals, with some ACTS projects supporting the activity. Major space segment operators such as Intelsat, Eutelsat and SES Astra are supporting this initiative.

In the field of advanced mobile terminals (Satellite-UMTS), ACTS projects have developed an approach based on compatibility with the Generic Radio Access Network (GRAN) approach developed in the terrestrial domain. This approach is supported by a number of companies. However, S-UMTS standardisation in ETSI has progressed slowly. As a consequence, ESA and several other entities have directly submitted to the ITU proposals for an air interface for S-UMTS, as a possible radio transmission technology. So far, there has been little evidence of wider industry support for these initiatives, quite in contrast to the level of debate that is taking place among terrestrial cellular operators. Possible reasons for this reluctance may be a lesser incentive for the satellite companies to achieve economies of scale, and a lesser necessity to ensure interoperability due to their large geographical coverage. The latter point also makes the issue of interoperability a lesser problem from an internal market perspective. Also, for some companies, standardisation for the pure radio technology is seen as being of lower priority as the advent of software radio, currently sponsored by ACTS projects, opens the prospect of manufacturing cheap multi-mode, reconfigurable terminals.

The TEN-Telecom programme is following up on some of the ACTS activities, in particular the project SATISFY 2000, addressing the commercial validation/feasibility of mobile broadband services such as internet and extranet access and connectivity plus multimedia interpersonal services. This commercial validation will be based on S-UMTS to provide global coverage.

6 CONCLUSIONS AND OUTLOOK

The Satellite Action Plan has helped to raise the visibility of the satellite communication sector, by increasing the awareness of existing problems, establishing priorities, focussing the actions, and building consensus on certain topics. Although many problems remain, actions taken at EU level to pave the way for a timely and co-ordinated introduction of certain satellite services in Europe, as well as the day-to-day contacts with operators, service providers and regulators in the various Member States concerning details in the regulatory and R&D groundwork proved beneficial.

The activities, discussions and reports made by the Satellite Action Plan Regulatory Working Group have been invaluable for the above areas of policy, if only to provide the **legitimacy of industry support** without which action taken by the Commission would not have the same impact and could, at times, be regarded upon as unwanted and unnecessary interference, particularly in the context of licensing. The R&D Working Group has significantly contributed to identify the needs of the sector in terms of new technology development and system validation. Its work has been used as an input to the definition of activities under the 5th Framework Programme.

The **continuation of the Satellite Action Plan activities** is consequently fully supported by the relevant Commission services. Future efforts should in particular focus on the following issues:

- At the regulatory level within Europe, there remains a short-term need for **implementation of existing legislation**. This applies, in particular, to measures taken at CEPT when these have been adopted in response to mandates by the EC, e.g. in the S-PCS context. In order to gear the SAP action into the regulatory activities at Community level and to underline that satellite communications are an integral part of telecommunications, it has been suggested that the Regulatory Working Group could develop ties to the other industry forum active at EU level, the European Telecoms Platform (ETP), in order to identify and pursue common interests. Also, on several occasions already, representatives from the Regulatory Working Group have been invited to attend the EU Licensing Committee in order to report on their activities and findings to the national regulators. This practice should be continued.
- Beyond that, a number of **further regulatory issues** will have to be addressed. Are the existing mechanisms sufficient for the introduction, within the EU, of broadband initiatives ? Can a co-ordinated assignment of frequencies and a streamlined set of authorisation conditions and procedures be put in place so as to ensure EU-wide coverage of new systems and networks ? These issues point to the need for Europe to shift its regulatory approach from a predominantly reactive towards a more forward-looking mode. A regulatory environment that is developed sufficiently in advance will give the necessary legal certainty and thereby encourage satellite communication initiatives to be launched. Key points to address are the simplification of licensing of satellite systems and the demand driven early planning and an allocation of spectrum. In this context, one-stop shopping mechanisms that could ease the regulatory hurdles prior to authorisation of new systems may be

particularly attractive to industry. As for spectrum availability, the reinforcement of the European preparation for international decision processes such as the ITU/WRC are critical to which the activities of the Satellite Action Plan can contribute.

- Concerning **third countries**, access barriers to the market for satellite communication remain a crucial issue for the sector. The Commission services will continue to address those issues, either through bilateral contacts or other suitable fora, and with the support from the industry information gathered and corroborated in the Regulatory Working Group. In the short term, a new round of fact gathering will be done to support a WTO implementation review. It will encompass major trading partners, countries negotiating accession, and specific regions such as Eastern Europe, the Mediterranean countries, and Latin America.
- In **Research and Development**, the 5th Framework Program will provide industry with further sponsoring opportunities, to be tightly co-ordinated with ESA work. The Satellite Action Plan R&D working group will continue to act as a representative platform to follow these activities.

The **ongoing debate in a number of policy areas** will shape the conditions under which the satellite communications industry will develop over the years to come. Key areas include

- the review, in 1999, of the EU regulatory framework for telecommunications (“**99 Review**”). This will also raise a number of satellite-specific issues, such as whether the current provisions of the Licensing Directive are adequate and sufficient, or whether new regulatory measures should be considered, in particular after the expiry of the S-PCS decision, in March 2000 ;
- the effectiveness of the existing mechanism, to defend European interests at international fora such as the **WTO**, or the ITU in the **next World Radiocommunications Conference, in spring 2000** ; and
- the frequency policy, at global, European and national level, and including issues such as efficient use of spectrum (sharing vs band segmentation), spectrum pricing and trading, etc. The consultation launched with the **Green Paper on radio spectrum policy** should provide orientation for further course of action in the course of 1999.

It will be important to associate the Satellite Action Plan activities to these exercises in order to ensure that the satellite communication sector sees its views and needs duly reflected.

ANNEX 1 : The original ACTION POINTS

Below is a short overview of the action points that were identified in the original Satellite Action Plan of 1997, and their present status :

The completion of the Internal Market

A1. The Commission will step-up efforts to achieve full implementation of all EU legislation relevant for satellite communications. The Commission will also request industry to provide regular information on the basis of a systematic overview of all barriers found in relation to the introduction of satellite communications systems and services.

- **Four reports on implementation of the regulatory package produced so far. Industry (SAP RWG) provides regular information on market access barriers in the Member States.**

A2. The Commission will **request industry to identify regulatory barriers, allowing the Commission to formulate regulatory measures** needed in the satellite communications sector, as well as report on the effectiveness of the measures taken to date.

- **SAP RWG recommendations ; discussions with member States in Licensing Committee and other fora. Topics include harmonisation of licensing conditions and fees, one stop shopping etc.**

A3. The Commission will request **CEPT to accelerate efforts** in the harmonisation of authorisation conditions and in harmonised use of frequency bands, **to review its current structure and procedures with a view to increase the efficiency** of its regulatory decisions making procedures and their implementation. The Commission will seek to improve its co-operative efforts with CEPT in order to enable **CEPT to support better the EU policies.**

- **ERC mandates given to CEPT, resulting in decisions on frequency harmonisation, harmonisation of authorisation conditions, free circulation and use of terminals. Other initiatives include Milestone Reviews, One Stop Shopping etc.**

A4. The Commission will request **ETSI to review its overall satellite communications work programme** with the aim to ensure, whilst allowing innovation, continued, efficient and appropriate, standard development in accordance with the priority actions identified in this Action Plan with the aim to ensuring the development of a fully competitive market.

- **SES working group within ETSI; work programme.**

A5. In particular, the **standardisation of advanced, broadband multi-media satellite terminals** for mass-market use is an urgent and continuing requirement which needs to be addressed with ETSI, CENELEC and industry.

- **Under review in ETSI.**

A6. On the basis of information to be supplied by Member States and the private sector, the Commission will continue to **review of the developments concerning the International Satellite Organisations** and take the appropriate steps with a view to ensure that these developments contribute to the achievement of a fully competitive satellite communications marketplace.

- **Active input to the process by the Commission, in particular on competition aspects.**

The reinforcement of the European position at an international level.

A7. The Commission will now focus on the full implementation of the commitments of countries in the framework of the recently concluded WTO Negotiations on Basic Telecommunications. Furthermore, the Commission will carry out, whilst consulting industry, an in-depth analysis of trade policy implications regarding international satellite communications issues and, for those areas where appropriate, make proposals to remove in a systematic fashion the remaining market access barriers. The Commission will also put forward proposals for the co-ordination of positions of EU Member States in international fora.

- **SAP RWG input. Market access barriers database for 3rd countries established. Possible future actions in WTO context where appropriate.**

A8. The Commission will **review the economic and trade issues related to orbits/frequencies and report to Council and Parliament.**

- **Partly covered in Green Paper on spectrum policy and WRC communications.**

A9. The Commission, together with CEPT and industry, **will review the European strategy in ITU sectors** i.e. standardisation, radiocommunications, development on satellite communications.

➤ **Issues raised in WRC communications.**

A10. The Commission, in partnership with industry, will assess on a systematic basis the global market opportunities, intellectual property rights issues relating to technology, and the role of potential European-led initiatives and formulate the appropriate supporting political actions.

➤ **SAP RWG is made aware of Commission meetings scheduled with 3rd countries. Background input fed in on regular basis.**

A11. The Commission, assisted by industry, will evaluate the opportunities arising from increased political and technological/industrial co-operation between EU and third countries including the US, Russia, Canada, Japan and developing countries. In view of the importance to associate the developing countries in this area, the Commission will also evaluate the use of the EU development funds. Moreover, the Commission will propose the necessary measures to stimulate a stronger presence of Europe in international markets.

➤ **Review under bilateral initiatives and dialogues under way (EU-Japan, EU Russia).**

A12. The Commission will take the appropriate measures to promote effective competition in this field at a world level and continue to ensure that the operation of global satellite systems does not impede competition on the relevant European markets, in conformity with Treaty.

➤ **1998 full competition and WTO commitments. Review of implementation and WTO assesment.**

Reinforcement of EU R&D support and Applications Development

A13. Identification of possible complementary actions at the framework programme level with Space Agencies notably ESA, industry and Member States ensuring complementarity of work programmes.

➤ **R&D report issued by industry and space agencies, outlining complementary actions ; further work under joint review with ESA.**

A14. R&D actions under the Fourth Framework Programme and use of such actions as preparatory work for the Fifth Framework Programme in view of the early implementation of the recommendations already elaborated on the basis of market requirements.

➤ **5th FP launched, input given by SAP R&D WG ; ACTS and ESPRIT actions launched in the field of satcoms, complementing space agencies developments**

A15. In the context of the preparation of the 5th Framework Programme, the need for pre-normative research in this field will be considered in order to assist notably in the area of a multimode (terrestrial-satellite) user terminal for broadband satellite mobile applications and in the area of transmit-receive broadband terminals to be used in uncoordinated mode with broadband multimedia space communication systems.

ACTS and ESPRIT actions launched in the field of multimode reconfigurable terminals, support to standardisation process and to ITU TG 8/1 process through ACTS collaborative work. 5th FP launched, input given by SAP R&D WG for complementary actions.**Conclusions**

A16. To facilitate the development of a longer-term vision of EU satellite communications policy in its international context, the **Commission will ensure an appropriate interface with industry comprising of representatives of relevant industry sectors** (network operators, service providers, equipment manufacturers, content providers, users and consumers) in view of supporting the Commission in the implementation of the Action Plan on the priorities and requirements for their supporting actions.

➤ **Currently SAP plenary, SAP regulatory WG, Satellite R&D WG.**

ANNEX 2 : GLOSSARY

ACTS (EU)	Advanced Communications Technology Systems
ACTS (US)	Advanced Technology Communication Satellite
ARTES 3	(an ESA programme to promote multimedia satellite systems)
ATM	Asynchronous Transfer Mode
BSS	Broadcasting Satellite Services
CEPT	European Conference of Postal and Telecommunications Administrations
DAR	Digital Audio Radio
DBS	Direct broadcasting satellites
DSL	Digital Subscriber Line
DTH	Direct-to-Home
ECTRA	European Committee for Telecommunications Regulatory Affairs
ERC	European Radiocommunications Committee
ERO	European Radiocommunications Office
ETO	European Telecommunications Office
ESA	European Space Agency
ETSI	European Telecommunications Standardisation Institute
EU	European Union
EUTELSAT	European Telecommunications Satellite Organisation
FCC	Federal Communications Commission
FP	Framework Programme
FS	Fixed Service
FSS	Fixed Satellite Service
GATS	General Agreement on Trade in Services
GMPCS	Global Mobile Personal Communications Services
GRAN	Generic Radio Access Network
GSM	Global Systems for Mobiles
HDTV	High Digital TV
INMARSAT	International Maritime Satellite Organisation
ISL	Intersatellite links
INTELSAT	International Satellite Telecommunications Organisation
IP	Internet Protocol
IPO	Initial Public Offering
ISO	International Satellite Organisation
IST	Information Society Technology
IT	Information Technology
ITU	International Telecommunications Union

LEO	Low Earth Orbit System
MFN	Most Favoured Nation
MoU	Memorandum of Understanding
MPEG	Motion Picture Expert Group
MRC	Milestone Review Committee
MSS	Mobile Satellite Services
NON-GSO	Non-Geostationary Orbit
OECD	Organisation of Economic Co-operation and Development
RTD	Research and Technological Development
SAP	Satellite Action Plan
SAP RWG	Satellite Action Plan Regulatory Working Group
SMATV	Satellite Master Antenna TV
S-PCS	Satellite Personal Communications Services
TEN	Trans European networks
WRC	World Radiocommunications Conference
WTO	World Trade Organisation
UMTS	Universal Mobile Telecommunications System