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EUROPEAN PARLIAMENT, THE EUROPEAN ECONOMIC AND SOCIAL  
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

**The World Radiocommunication Conference 2003  
(WRC-03)**

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## 1. INTRODUCTION

The International Telecommunications Union, a United Nations agency, holds every three years a World Radiocommunication Conference, which is the mechanism to update the ITU Radio Regulations, the global agreement on how the airwaves are to be used without harmful interference between the many wireless services of all the different countries of the world. The next WRC-03 will take place in Geneva between June 9<sup>th</sup> and July 4<sup>th</sup>, 2003. For the thousands of delegates from over 150 countries attending it will be the end event of a process of preparation which began immediately following the last WRC, in Istanbul in 2000.

The Commission will participate in the forthcoming WRC-03 as a non-voting delegation<sup>1</sup>. In this quality, the Commission takes a particular interest in supporting decisions which are **compliant with relevant Community policies** and which adequately reflect commercial and general interests in the European Union. The Commission also endeavours to support before and during the conference agreed European common positions which are related to Community policies. In participating in WRC-03, the Commission fulfils its role as expressed in the **Radio Spectrum Decision**<sup>2</sup> which entered into force since the last WRC exercise.

Negotiations at the WRC are mainly of a technical/regulatory nature, with political and industrial policy implications which are at times somewhat hidden or understated. Many issues are discussed at the conference in great technical detail without any explicit connections with underlying policies. "Simple explanations" of WRC agenda items are therefore often difficult.

This Communication aims to assist in clarifying the WRC-03 process by addressing in the context of the Community various agenda items open for negotiation, with the intention to reinforce European technical negotiating positions at the conference by linking them to Community policy objectives. The Commission calls upon Member States as negotiating parties to support these positions during the negotiations.

WRC-03 is considered to be less immediately "crucial" than some previous world radio conferences, where projected new commercial satellite and terrestrial mobile systems urgently requested sufficient globally harmonised spectrum to be able to operate successfully. However, while some systems are still trying to obtain more spectrum for expected future requirements, the focus at this WRC has mainly shifted to most radio services "protecting" their acquired rights. It is indicative of this trend that the five "priority issues" highlighted by the Commission for WRC-00<sup>3</sup> (*IMT-2000*, *RNSS*<sup>4</sup>, *sharing between different satellite systems*, *fixed wireless access* and *satellite broadcasting*) were essentially considered "solved" by the 2000 negotiations, but are all back on the agenda for WRC-03 for a "verification" of the previous

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<sup>1</sup> Formally as an ITU "sector member" (category: Regional and Other International Organisations)

<sup>2</sup> Decision No 676/2002/EC of the European Parliament and the Council of 7 March 2002 on the regulatory framework for the radio spectrum policy of the European Community.

<sup>3</sup> COM(2000) 86, 8 March 2000, The European Positions for the World Radiocommunications Conference 2000 (WRC-2000).

<sup>4</sup> Explanations about acronyms are in Annex IV (Glossary)

agreements. Therefore, the overall positive results of WRC-00 need to be consolidated at this conference. In addition, WRC-03 will consider a few new initiatives with some relationship with Community policy objectives.

The communication is structured into three main areas:

- a description of the WRC context (*section 2*) and of the European involvement (*section 3*) in the WRC-03 process;
- an explanation of relevant Community policies for WRC-03 (*section 4*);
- an analysis of the main WRC-03 negotiating items which may affect Community policies, and of the European objectives in the light of positions developed by CEPT (*section 5*).

## 2. THE WRC IN THE CONTEXT OF SPECTRUM POLICY IN THE EUROPEAN COMMUNITY

There is a growing awareness of radio spectrum issues in the Community, with efforts to look at issues at this level gaining momentum. This trend requires to position the WRC conference in the Community context.

**The increasing importance of spectrum:** the economic contribution of radio-based industries to the EU's economy has grown strongly in recent years, notably via the development of commercial mobile communications, such as GSM, and of broadcasting networks<sup>5</sup>. Radio spectrum is also an **essential infrastructure** in the provision of services in the public interest (defence and other security functions, transport, public service broadcasting), for scientific research (Earth observation, radio astronomy) and for establishing international networks, such as Galileo. Radio spectrum harmonisation in Europe is a key enabler to the completion of the **Single Market** in goods and services, and can foster international **commercial exchanges** by removing technical barriers to trade. Furthermore, spectrum allocation and licence assignment can have clear repercussions on the **degree of competition** allowed between different technical platforms and operators.

**The spectrum "bottleneck":** given that ideally access to radio spectrum ought not to be a constraint on the operation of any wireless service, the "natural" approach in this era of regulatory liberalisation would be to support *every* request for spectrum, and let different applications or services compete on the basis of price, consumer satisfaction, innovation potential, public needs or other criteria. However, the limits of today's radio spectrum management practices are exemplified at a spectrum management conference like WRC. Since useful spectrum is essentially "full", any new proposed allocation entails prolonged negotiations with other new or existing interests. Spectrum management both internationally and at the national level is therefore about choices, notably about the **difficult balance** to be struck between encouraging new

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<sup>5</sup> For example, the economic value of the radio industry (excluding civil aviation, defence and other public sector use of radio) is some £20 billion per annum in the UK alone (source: Radio Agency, Feb. 2001).

innovative applications and protecting existing services. Furthermore, while harmonisation of spectrum use can lead to cost benefits for many technologies and to radio services co-existing together more easily, at the same time all these layers of regulation can lead to a certain loss in flexibility of use and thus in commercial dynamism.

**Policy coordination in the Community:** in order to make the necessary spectrum choices as “meaningful” as possible, the Community holds that **close coordination** between the radio **spectrum management** process and underlying **policies** is essential. Therefore the Decision on Radio Spectrum Policy was adopted in 2002, to provide the Community with a framework to develop this coordination, and to set up institutional arrangements within the Community where radio spectrum requirements for all Community policies could be addressed and their interests appropriately balanced<sup>6</sup>. In this new framework the impact of policy on spectrum management decisions, including licence assignment methods, can now be discussed in a Community context via the **Radio Spectrum Policy Group**<sup>7</sup>, (RSPG). Furthermore, to support specific Community policies, relevant technical implementation measures to harmonise the use of spectrum across the European Union can now also be undertaken by the Commission together with the Member States in the **Radio Spectrum Committee** (RSC).

**The Radio Spectrum Decision and WRC:** the Radio Spectrum Decision has allowed for the first time to clarify in EU legislation the general relationship between the Commission and the current set-up in voluntary spectrum coordination undertaken in Europe by the Member States in the CEPT<sup>8</sup> context. A clear methodology is now defined in the legislation, where the Commission, working with the RSC and often following the specific advice of the RSPG, may provide CEPT with **formal mandates** to develop spectrum harmonisation to fulfil Community policy requirements.

The Radio Spectrum Decision provides a mechanism for coordination of Community positions and for the establishment of common policy objectives in WRC. It also allows for coordination of Community positions to benefit from the preparation of coordinated technical European positions carried out within CEPT. According to the Decision, Member States and the Community must develop common action and closely cooperate during the whole negotiation process in order to safeguard the unity of the international representation of the Community.

In line with its commitments, the Commission has to ensure coordination of policy approaches based on the adoption of Community policy objectives in advance of WRC. With this Communication, the Commission aims to inform the European Parliament and the Council about affected Community policies, with a view to obtain endorsement by the Council on the Community policy objectives to be achieved and on the position to be taken by Member States at the WRC.

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<sup>6</sup> This is even more important now, with the imminent enlargement of the European Union, where there is a need for high-level discussion on how best to harmonise different spectrum practices and uses.

<sup>7</sup> Decision 2002/622/EC of 26 July 2002 establishing a Radio Spectrum Policy Group (RSPG)

<sup>8</sup> European Conference of Post and Telecommunication administrations, with 45 members across Europe.

The Commission has accompanied the WRC-03 preparatory process in Europe over the last three years. While the adoption of the new radio spectrum regulatory framework has come too late to have a specific impact on the current WRC cycle, Community activities in spectrum harmonisation and policy development are expected to provide a **significant input** to the European preparations for future conferences.

### **3. UPHOLDING EUROPEAN INTERESTS IN WRC-03**

**European activities within CEPT:** European administrations negotiate in ITU on a national basis, unlike for other international negotiations<sup>9</sup>. However, since in practice on many issues **the national interests are convergent**, European States choose to develop their technical positions together within CEPT, where mechanisms to develop common technical approaches are already well established, before negotiating with the rest of the world on the basis of consolidated European positions<sup>10</sup> defended by each individual European member of ITU.

**The Commission's participation:** the Commission will take part in WRC-03 on behalf of the Community with the modalities, functions and objectives first laid down in 1992<sup>11</sup>, as now provided in the Radio Spectrum Decision. Together with the Presidency, the Commission will endeavour to assist Member States in maintaining common negotiating positions during the conference. To this effect, Member States should support and sign all European Common Proposals fulfilling Community policy objectives and positions endorsed by the Council.

**Monitoring Europe's performance:** the Community coordination approach is predicated on CEPT being able to develop **coherent technical positions** for Europe, and on its ability to get results by a sufficient degree of negotiating solidarity between all its members at pan-European level. All accession and candidate countries are Members of the CEPT, and the successfully concluded enlargement negotiations are likely to be conducive to the necessary coherence between delegations. CEPT, however, also comprises a number of administrations which are not part of the enlarged EU, where underlying policies are not necessarily aligned with EU ones. In line with Article 6 of the Radio Spectrum Decision, the **Commission will monitor Europe's involvement in WRC-03** according to the above-mentioned goals.

**Industry involvement:** in preparation for WRC-03, as for previous conferences, the Commission co-hosted with CEPT two open consultation meetings, first to give spectrum user constituencies at large the opportunity to give timely input to the

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<sup>9</sup> Notably trade issues in the WTO context.

<sup>10</sup> The ITU has encouraged the formation of "regional blocks" in the WRC to simplify and clarify as much as possible specific issues before the conference itself. Therefore, other regional organisations besides CEPT have also been increasingly developing their positions together: CITEL for the Americas, APT for Asia-Pacific, the Arab League and ATU for Africa. While collaboration within these other organisations is improving, it is both more recent than in CEPT and also made more difficult by greater national policy divergences than in Europe.

<sup>11</sup> Council Conclusions for WARC 1992 of February 3, 1992, reiterated by Council Conclusions in 1997 and 2000.

process, and then to provide feedback on the agreed European common negotiating positions. Industry has also been more actively involved in the CEPT preparations, providing for instance some 12 out of 40 CEPT agenda item coordinators. While improvements are always possible, the perception sometimes given at previous conferences that they were negotiated by “closed clubs” of regulators is rather less evident for WRC-03. The Commission will continue to encourage a **full participation** by industry and by all other spectrum users in the process.

Negotiations at WRC tend to be constrained at times by the **lack of information** about technical systems and actual or prospected spectrum usage. One of the practical ways the new Community framework intends to support industry and other users, is to ensure that sufficient information is available, at least at European level, to assist policy-makers to match spectrum supply with demand.

**Maintaining coherence with Community objectives:** while common positions for most relevant agenda items are available before WRC-03, negotiations during the conference are of a dynamic nature. Any modifications of positions during the negotiations should take due account of Community and public interest considerations.

Community objectives should be particularly borne in mind, notably:

- the promotion of **competition** between alternative infrastructure platforms
- the consolidation of the **Single Market** (support for harmonisation);
- the removal of technical barriers to **international trade**;
- the **basic principles** of EC electronic communications regulation (see section 4).

In order to fulfil the objectives established in the Radio Spectrum Decision, coordination of EU Member States’ positions may need to be organised during the negotiations by the Commission in close collaboration with the Presidency to uphold Community interests.

**Acceptance of international agreements:** Member States, while acting independently in the CEPT context, will continue to be guided in their decisions at WRC by the European Union’s *acquis communautaire*, where applicable. For this purpose, the Presidency of the European Community shall submit a **joint declaration** for inclusion in the Final Acts of WRC-03, where the delegations of the Member States of the EU will state that they will apply the revision of the ITU Radio Regulations adopted at the conference in accordance with their obligations under the EC Treaty.

#### 4. RELEVANT COMMUNITY POLICIES FOR WRC-03

The **overall objective** of the European Commission in the WRC process is to **ensure that decisions are taken that positively support**, or at least do not significantly hinder, specific **Community policies** and initiatives. The European technical positions developed within CEPT for WRC-03 are the result of internal negotiations and summation of national policies, and tend to be **generally in line** with relevant Community policies, which, with some exception, are broad statements of vision, rather than specific action plans easily mapped on the radio regulatory process.

WRC negotiations are also a lot about “tactics”, i.e. the negotiating means to position optimally different viewpoints in the Radio Regulations or in future ITU activities. The Commission will not usually take a position on these procedural/regulatory discussions, unless there is the likelihood of a clear impact on Community policies. In the main, such policies will be affected by topics addressed at the conference in two ways:

- either relating to the **spectrum needs** of long-term future evolutions (e.g. transition from analogue to digital) of systems supporting these policies; or
- concerning the **protection of existing frequency allocations** with respect to possible new entrants in the new spectrum.

As in the past, a number of Community policies will be potentially affected by regulatory decisions taken at WRC-03. Here is a brief **overview** of the main ones:

##### **Information Society**

One of the EU’s objectives is to ensure that Europe’s citizens, business and governments will continue to be provided with rich, advanced and diversified information services, to ensure that Europe can play a leading role in shaping and participating in the global knowledge and information based economy. The shift to the information society and the knowledge-based economy are essential for Europe to draw the full benefits of digital technologies and the Internet in terms of **sustainable growth**, increased productivity and competitiveness, creation of new jobs and social progress.

Therefore, the Community has been working (notably via *eEurope* initiatives) on stimulating the development of **applications and content** enabling all European citizens to participate in the information society and on supporting **research** into the development and deployment of new information and communication technologies.



Furthermore, by establishing a new **regulatory framework** for electronic communications<sup>12</sup> designed to generate competition, the European Union has moved a step further on the road towards supporting a world-class communications and broadcasting infrastructure, basing itself on **clear principles**, namely that regulation in electronic communications ought to:

- evolve towards **technology neutrality**, taking into account convergence.
- be based on clearly defined **policy objectives**, notably the public interest;
- provide appropriate **legal certainty** to ensure investment and **sufficient flexibility** to respond to fast-moving markets and technology;
- be enforced **closely to the market**; and
- be kept to the **minimum necessary** to achieve its objectives.

The development of the Information Society policy is also dependent on spectrum regulation and on the results obtained at WRC. While radio spectrum regulation covers other sectors besides a narrow definition of “electronic communications”, it will also benefit from the principles enunciated above, within a spectrum policy context of avoiding harmful interference and using this resource efficiently.

### **Audiovisual Policy**

In addition to its economic importance, the audiovisual sector also plays a key social and cultural role in the European Union: television is the most important source of information and entertainment in European Societies, (98% of homes with a television, the average European watching more than 200 minutes television per day).

The Commission stresses that the audiovisual media play a major role in the transmission of social and cultural values and that there are therefore fundamental public interests at stake<sup>13</sup>. As a consequence, it must be ensured that broadcast services continue to have available the necessary resources, notably access to the radio spectrum. This should be done taking into account technological and commercial developments and the specific structure of the dual system of broadcasting in Europe, comprising public and private broadcasters.

### **Transport**

In order to further the common transport policy in the European Community provided for by the EC Treaty, the Commission has proposed<sup>14</sup> some 60 measures to develop an integrated transport system, including notably **maritime safety**, and air transport. In this context, the creation of a **Single European Sky** has the objective to optimise

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<sup>12</sup> Directive 2002/21/EC on a common regulatory framework for electronic communications networks and services (Framework Directive)

<sup>13</sup> Communication on Principles and Guidelines for the Community’s audiovisual policy in the digital age, COM(1999)657 final

<sup>14</sup> Second White Paper on the future development of the common transport policy, COM(201) 370

air traffic management and aviation safety, in order to satisfy all airspace users, whether civil or military, airspace being a common asset to be managed collectively regardless of national borders. All these objectives are critically dependent on the availability of radio spectrum.

An important element of the Community's transport policy is also the **Galileo** satellite navigation programme, which aims to provide the European Union with an independent, highly-reliable, advanced global satellite navigation system for strategic and economic reasons. Satellite navigation offers obvious advantages for managing transport. It allows for greater safety, better traffic flow, reduced congestion and environmental damage, and the support of multi-modal development. Like for any radio service, to operate Galileo sufficient radio spectrum needs to be available, protected from harmful interference and employable without too many operational constraints.

### **Civil Protection Coordination**

The European Union suffers regularly from major natural and man-made disasters, such as earthquakes, floods, landslides, storms, forest fires. The purpose of **Community cooperation** in the field of Civil Protection is to help ensure better protection for people, the environment and property in the event of such disasters. More specifically, it aims to support and supplement efforts at national, regional and local level with regard to disaster prevention; to establish a framework for effective and rapid cooperation between national civil protection services when mutual assistance is needed; and to **enhance the coherence of actions** undertaken at international level in the field of civil protection. Council has adopted a Decision<sup>15</sup> establishing a Community mechanism to facilitate reinforced cooperation in civil protection assistance interventions. Through this mechanism, it is possible in case of natural and environmental disasters, to mobilise the necessary operational resources to provide prompt support and assistance to countries (inside and outside the European Union) in need of help. The coordination of joint European interventions would be improved by the interoperability of communications equipment fostered by harmonised spectrum.

### **Single European Space**

Instigated by a recent Green Paper<sup>16</sup> jointly produced by the Commission and ESA, an in-depth debate is currently under way in the European Union on a new policy integrating space into its competence. Space represents a **strategic tool** for the EU to implement some of its broader goals. For instance, European satellites provide businesses, public authorities and individuals with services such as broadcasting, communications, sustainable transport and mobility, weather forecasting, monitoring of climate change, and responses to emergencies. The Galileo project and the GMES (Global Monitoring for the Environment and Security) initiative are practical examples of cooperation on space-based initiatives at European level.

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<sup>15</sup> Council Decision of 23 November 2001, (2001/792/EC), establishing a Community Mechanism to facilitate reinforced co-operation in Civil Protection assistance interventions

<sup>16</sup> Green Paper on European Space Policy, COM(2003)17, 21 January 2003

The relationship of a vibrant space sector for Europe with an adequate supply of spectrum is self-evident. All these applications are dependent on frequency allocations and other regulatory procedures developed within the WRC process.

### **Research and Development**

All the Community policies mentioned until now, and indeed all the technologies addressed in the WRC context are underpinned by research and development (RTD). A high level of scientific and applied **RTD is crucial for a country's economic growth** and is thus publicly funded in all Member States. Increasingly, RTD is also carried out at a European level, since pooling the complementary expertise provided by scientists from different countries can prove beneficial to all and have a multiplier effect on national research. The objective of research and technology policy in the European Union is therefore to coordinate national and European policies and to encourage the networking of research teams.

Funding of European research via the Community's multi-annual RTD Framework programmes has supported and continues to support key areas using wireless technologies, notably 3G mobile communications, RLAN, intelligent transport systems, Galileo and other satellite-based platforms. Timely access to radio spectrum harmonised at European and global level will continue to be essential for these applied research efforts and provide researchers with a focus to turn their visions into real applications available to European society. At the same time, research activities are making a significant contribution to the efficient and fulsome use of spectrum by developing new technologies such as software-defined radio and adaptive aerials.

## **5. PRIORITIES FOR THE COMMUNITY AT WRC-03**

With regard to the WRC-03 agenda items which are particularly relevant in the context of Community policies, the following objectives should be endorsed:

- Protecting the allocations gained in WRC-2000 by IMT-2000 and GALILEO (*agenda items 1.34 and 1.15, respectively*), relating to Information Society as well as to transport policy objectives (satellite radio navigation);
- Making progress towards regionally and globally harmonised frequencies for PPDR (Public Protection and Disaster Relief) systems, relating to the Community policy in this field (*agenda item 1.3*).
- Supporting the establishment of alternative wireless infrastructure platforms, in order to increase competition for the benefit of the consumer, as explained in the *eEurope* framework. In this context, a globally-harmonised status for RLANs in the bands identified by Europe is essential (*agenda item 1.5 et al.*).

The following sections provide a brief background for each of these issues, together with the Community policy objectives to be met at the conference. A supplementary analysis of the technical issues discussed at the conference for these topics can also be found in **Annex II**.

There are in addition other less critical issues at WRC-03 which have some Community interests associated to them. They are briefly described in **Annex III**.

### 5.1. Third generation mobile communications

The first IMT-2000 (“3G”) services have recently been launched in Europe, and operators will follow suit in most Member States later this year, with the gradual introduction of new services and terminals to customers. The continued transition to 3G services will need to be supported in the longer term by the timely provision of adequate spectrum according to market demands and taking into account the evolution of technologies.

There are two main issues of relevance to 3G at WRC-03. The first issue addresses the **protection** of Europe’s extension band for IMT-2000 from potential interference from satellite systems in Asia (ITU region 3). The second question is about the preliminary exploration of possible additional future **spectrum needs** for IMT-2000 and systems beyond IMT-2000. However, both aspects are governed by a different time perspective and therefore require different approaches with respect to the WRC negotiations.

**On the issue of protecting additional IMT-2000 spectrum**, Europe has recently agreed to make the band 2 500-2 690 MHz available by 1 January 2008<sup>17</sup>. This spectrum goes beyond the core band at 2 GHz, which has already been licensed to operators in all Member States, and is one of the three possible extension bands identified for IMT-2000 at WRC-00. In a second step to be taken by the end of 2004, Europe will develop a frequency plan for this additional band.

Part of the European extension band for IMT-2000 (2 630-2 655 MHz) has a primary status<sup>18</sup> for the broadcasting-satellite (sound) service in eight Asian countries. Any potential sharing problem between these BSS (sound) systems and IMT-2000 could affect the long-term provision of IMT-2000 services in some European countries, since some of the proposed (not yet deployed) BSS (sound) systems will have highly elliptical orbits, which are increasing the likelihood of interference with terrestrial services in many other countries, given the extended line-of-sight visibility of these systems<sup>19</sup>.

**On the issue of future work on advanced mobile systems**, WRC-03 has been tasked to review studies commissioned by WRC-00 on spectrum requirements of future developments of IMT-2000 and of systems beyond IMT-2000. Existing IMT-2000 radio interfaces and networks are expected to be enhanced throughout their operational life times, perhaps reaching service bit rates of 30 Mbit/s, while new technology will need to be developed to provide for even greater bandwidths (100 Mbit/s or even higher) and interoperability

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<sup>17</sup> ECC Decision (02)06, 15 November 2002, pursuant to Mandate 4 of the European Commission, on the designation of frequency band 2500-2690 MHz for UMTS/IMT-2000

<sup>18</sup> Radio services with primary status have a blanket “priority” in the ITU Radio Regulations over “secondary status” services, i.e. they cannot be interfered by them.

<sup>19</sup> A satellite of this type serving Japan could be “visible” from Europe and therefore potentially cause interference.

Given expected growth rates of the sector, Europe assumes that there will be a need for additional spectrum for advanced terrestrial mobile systems at some point beyond 2010. However, **a more clear definition of the market is required** before addressing in detail the possibility of additional frequencies for future developments of IMT-2000 and of “systems beyond”. Any new identification of spectrum for these systems will need to be based on deliverables from the research side and on studies on market estimates, quantity and timing of additional spectrum needed, and candidate new frequency bands. Europe’s common position is therefore to request ITU to finalise such studies on the future development of IMT-2000 and systems beyond IMT-2000 in time for WRC-07. Whatever developments on this issue, Europe wishes for IMT-2000 and its enhancements to continue to operate in the frequency bands already identified by the WRC (1992 and 2000) for the foreseeable future.

### **Community policy objectives**

It is essential to **ensure that IMT-2000 can operate** protected from harmful interference. This requires that the additional spectrum bands for which Europe has made a first choice are as little affected by non-GSO BSS (sound) satellites as possible, by avoiding technical restrictions which could have a negative impact on the rollout of 3G systems. The **global uptake of the extension band chosen by Europe** for IMT-2000 should be encouraged, in order to favour an early harmonisation of the used spectrum bands.

It is also important to **keep all options open** for further spectrum identification in the future for developments in IMT-2000 and for systems beyond IMT-2000, on the basis of market experience of current systems and progress in RTD. In this context, coordinated research at Community level into new mobile technologies focussing on interoperability and new applications will play an important role<sup>20</sup>. However, the migration between cellular technologies is an evolutionary process which takes time. While 3G services are still becoming established, it is preferable not to take radio spectrum decisions for a further cellular generation at a too early stage, but rather to leave some time for industry and operators to develop their services in a **stable regulatory context**, and to consider new mobile systems and their spectrum needs in an evolutionary way.

## **5.2. Satellite radio navigation**

For several years the European Union has been developing an advanced second-generation European radionavigation-satellite system (RNSS), **Galileo**, to determine the exact position in time and space of any person or device equipped with a portable receiver. The Galileo constellation of 30 satellites covering the entire surface of the globe has been designed as an independent, global, civil-controlled system which will provide open access and controlled access services, including reliable signals for safety-of-life applications, such as civil aviation and maritime transport.

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<sup>20</sup> In the new IST programme, “*Mobile and Wireless Systems beyond 3G*” is a “strategic objective” for the period 2003-2004. “*Systems beyond 3G*” are characterised as a “horizontal communication model”, where different terrestrial access levels and technologies are combined to complement each other in an optimum way for different service requirements and radio environments. Research supported by the Community is expected to focus on providing full seamless and nomadic user access to new classes of feature-rich applications.

At the Istanbul World Radiocommunication Conference (WRC-00), under the impetus of the new Galileo programme, spectrum additional to that already used by GPS and GLONASS was allocated to satellite radionavigation services, (and not specifically to Galileo or to other radionavigation systems). New allocations were considered essential for the development and enhancement of new and existing RNSS systems and therefore WRC-00 allocated 3 new “downlink” bands and 2 new “uplink” bands to RNSS. However, in order to ensure adequate protection to other important services, such as radionavigation aids for **civil aviation**, some operational characteristics of RNSS in two of the downlink bands identified in WRC-00 were left subject to confirmation at WRC-03<sup>21</sup>. Further details about these issues can be found in Annex II.

### **Community policy objectives**

While the technical characteristics of the frequency allocation granted to satellite navigation in WRC-00 need to be confirmed at WRC-03, it is essential for the European Union to ensure that these frequencies are employable in such a way to **enable Galileo to provide all its planned services**. It is also in the EU interest for both civil aviation and RNSS systems to co-exist in the 1.2 GHz band with acceptable solutions not unduly constraining either of these two important services.

This conference will also consider issues of future coordination of the various satellite radionavigation systems within the frequency spectrum allocated at WRC-00. **Any regulatory discrimination against Galileo must be avoided**. An equitable access to the allocated spectrum is paramount, on the basis of interoperability and mutually agreed levels of interference.

### **5.3. Public Protection (emergency situations and disaster relief)**

Interoperable telecommunications equipment for public security services (police, fire, ambulances, armed services, search & rescue teams...) is a desirable objective for operational and cost-effectiveness reasons. However, **interoperability is low** at the present time, even *within* countries, historically due to the different and uncoordinated procurement policies of the various security services and to the long lifetimes of their communications equipment, which typically does not benefit from large production runs. Furthermore, in a crisis situation occurring on land, it is often difficult for intervening teams from outside countries to be allowed to use their own communication equipment, and when they are given this authorisation, to be able to communicate with each other, given the differences in equipment<sup>22</sup>.

In many countries, significant amounts of spectrum are provided for security functions, but often using different frequency bands. A factor increasing interoperability would be to harmonise the radio spectrum used, which would also make the equipment more affordable via economies of scale. As requested by some developing countries which are heavily affected by natural and man-made emergency

<sup>21</sup> Note that the issues of potential interference due to the overlapping between the GPS M-code and Galileo PRS signals in the band 1559-1610 MHz are *not* formal issues at the conference.

<sup>22</sup> This situation is in stark contrast with similar emergency situation **at sea**, where clear procedures and common communication channels and technologies have long been available.

situations, WRC-03 has to consider global and regional spectrum harmonisation for future PPDR systems (public protection and disaster relief). This issue has led to a broad discussion on whether the PP element (police, security, etc.), where the spectrum requirements tend to be well defined and stable, ought to be separated from DR (disaster relief), where localised “hot spots” of communications are needed at short notice and for transient periods of time. Furthermore, it has been argued that commercial networks based on new cellular technologies like IMT-2000 could be used for many PPDR functions, without the need for specific custom solutions. In addition, most PPDR systems are presently based on narrow-band analogue technologies, and any decisions taken on the radio spectrum ought to assist in the future migration towards data-rich digital systems affording greater functionality (such as video images, etc.).

#### **Community policy objectives**

The European Union is promoting a reinforced coordination mechanism amongst Member States in civil protection intervention in order to improve the efficiency of emergency interventions and reduce duplication. Despite a limited degree of spectrum harmonisation within the Community, the **lack of equipment interoperability** is evident in this sector and needs to be tackled in a gradual fashion, with as paramount the operational requirements of the security services. Any decision at WRC-03 which could assist in improving the long-term coordination abilities and equipment functionality of European civil protection teams is therefore to be strongly supported.

#### **5.4. Alternative Infrastructure Platforms, *including RLAN***

The European Union considers that creating conditions of **vigorous competition** between different technological infrastructure platforms in electronic communications is in general the **most appropriate way to benefit consumers** in the long term, by providing them with sufficient choice on the basis of cost, functionality and service provision. Besides IMT-2000, there are several other commercial wireless systems affected by the negotiations at WRC-03. They have been grouped together, since essentially they all **seek adequate spectrum and protection** from other radio services, in order to be in an optimal position to participate in this infrastructure competition.

From a Community point of view, where possible spectrum regulation ought to be **technology-neutral** and support the needs of all existing and innovative systems. The Commission recognises that these principles are often difficult to adopt in practice, and that the development of technological sectors, including their spectrum needs, is also very difficult to forecast. However, to decide on the extent of the spectrum access needs for various broadband wireless platforms, a clear position on which one to **prioritise in Europe** in terms of spectrum use would need to be developed – such decision should be based on the ultimate benefit to the European consumer, taking into consideration the relative technology maturity, costs and business plans associated to each system. The current draft work programme for the Community’s Radio Spectrum Policy Group (RSPG) includes the possibility to identify in a coherent way the spectrum requirements at European level of various wireless broadband terrestrial and satellite platforms.

A number of wireless communication “platforms” will be discussed at WRC-03. The following description addresses the main ones.

#### 5.4.1. Radio Local Area Networks

Radio Local Area Networks (RLAN – also called WLAN or Wi-Fi) operating in licence-exempt frequency bands are a fast-developing means to implement broadband wireless access for the general population in areas such as airports, train stations, conference centres and hotels. The current technology is using the unlicensed portion of the 2.4 GHz band, but the 5 GHz band is potentially more interesting, as it is not so strongly populated by other licence-free devices, and it also provides a bigger “slice” of spectrum, with therefore more capacity available for the systems operating in the band.

The discussion in WRC-03 will be focussed on **fostering global harmonisation** of RLAN equipment via the introduction of a global primary allocation for the mobile service at 5 150-5 350 and 5 470-5 725 MHz. Such an allocation would also protect RLAN systems from additional future constraints which could be imposed on them by any new service being allowed in the band at some point in the future. Several other important radio services besides RLAN already operate in the 5 GHz band, such as military radar and various commercial and scientific satellite services. Since it is likely that millions of licence-exempt RLAN terminals will eventually populate this band, it is essential to make adequate provisions to avoid harmful interference with other users. Europe is supporting an agreement at WRC-03 on the basis of the mitigation techniques already adopted in CEPT<sup>23</sup>, (notably the detection and avoidance of channels occupied by radar), and which will also be included in new versions of the Wi-Fi and in the new HIPERLAN standard<sup>24</sup>.

#### **Community policy objectives**

In line with the European Union’s policy to encourage multiple broadband access platforms to the Information Society, the Commission is undertaking a number of initiatives to support a strong market in RLAN systems and services<sup>25</sup>.

Within this context, the identification of frequency bands for wireless access systems (WAS, including RLAN) at global level is to be strongly supported, since it will drive down costs and increase the commercial opportunities of the sector. At the same time, **excessive operational constraints** would also place significant technical and cost burdens on RLAN systems and ought to be avoided.

The **protection of other essential services** using the 5 GHz band is **paramount**, though the principle of regulatory technological neutrality requires that RLAN systems ought not to be excluded *a priori* from the market place on the basis of

<sup>23</sup> ERC Decision (99)23.

<sup>24</sup> Harmonised standard EN 301 893 developed by ETSI under Directive 1999/5/EC (the R&TTE Directive). Compliance with this standard will ensure adequate protection of other services.

<sup>25</sup> A Commission Recommendation calling upon Member States to allow the provision of public services by RLAN was adopted recently (OJ L 78, 20.3.2003, p.12). It will be followed by a debate in the Community on the opportunity to further harmonise RLAN spectrum usage.



specific mandatory spectrum-sharing methods, since room should be left for future innovative technologies to meet the requirements of existing services in other ways.

#### **5.4.2. High-Density Fixed Satellite Services**

High Density Fixed Satellite Services (HDFSS) are satellite systems providing broadband interactive services expected to be launched some time in the future. They involve the deployment of a large number of Earth stations for satellite systems of any orbital type (i.e. geostationary or not) and with any available technology. HDFSS applications will benefit from low-cost, small antenna sizes, high frequency reuse and flexible, rapid deployment according to market needs. In general, the expected proliferation of HDFSS Earth stations means that any technical coordination with other services on a site by site basis (as happens with other satellite systems) would not be appropriate.

Following work carried out in previous conferences, WRC-03 is considering additional globally harmonised bands for HDFSS again. While some bands are already allocated to general FSS systems below 30 GHz, these bands could be fully-utilised by the time HDFSS services are finally launched. The satellite industry has therefore been requesting additional spectrum, preferably below 40 GHz, where the technology is already available.

The core of the issue is therefore the identification of additional bands for HDFSS at a global level, while causing the least possible problems with existing services. However, since different regions in the world have different spectrum uses and wireless sectors at different levels of development, a global agreement on all possible frequency bands could be difficult.

#### **Community policy objectives**

Commercially-viable HDFSS systems could contribute to the political objectives of fostering viable platforms for future broadband interactive services in healthy competition amongst each other, to the benefit of innovation and ultimately of the consumers. Their development has therefore been supported by the EU's joint RTD activities<sup>26</sup>. Future frequency requirements for these systems need to continue to be actively considered in Europe, though in ways which do not hinder the development of other important wireless services. Global harmonisation of operating frequencies is also important, to drive costs down and increase the attractiveness of HDFSS services.

#### **5.4.3. Broadband services in aircraft**

With the increasing requirement for people to remain continuously in contact and to be able to access information in all environments, there is a renewed push to provide two-way broadband communication facilities in aircraft, following a distinct lack of success in this area (e.g. TFTS in Europe). Some European airlines (such as Lufthansa and BA) have recently begun proposing a high-speed internet access and e-mail on board planes on an experimental basis, but for this service to be implemented permanently there is a need to amend the ITU Radio Regulations, to allow a new

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<sup>26</sup> 4<sup>th</sup> and 5<sup>th</sup> EU RTD Framework, IST programme

secondary allocation in the 14.0-14.5 GHz band for the aeronautical mobile satellite (AMSS), which would be used for the uplink channel from the aircraft to the satellite.

Internet-based services will be provided to passengers within the plane itself by RLAN or Ethernet means. In addition, airline operational services will also be available via this system, for example specific information support for the cabin crew. Note that what is proposed is not a safety-of-life communication channel for the aircraft, since anyhow a secondary allocation will not protect this service from being interfered with by other services with primary allocations in the same band.

#### **Community policy objectives**

As long as any possible interference towards other services (mainly FS, FSS and RAS) is acceptable, the introduction of reasonably-priced broadband communication services within aircraft is to be strongly supported in order for European passengers to benefit fully from this promising new service. Furthermore, while the protection of other services is essential, it is important to support this new application by avoiding excessive operational constraints. Given the long-range scope of aviation, a favourable global regulatory outlook for this service is important to its success.

While not related to this specific agenda item, the potential of broadband communications between aircraft and ground-based air traffic control to improve capacity, safety and security is important and should be supported in the future.

#### **5.4.4. Mobile Satellite Services (MSS)**

Mobile satellite systems can provide voice, and increasingly data, services for people on the move in all areas of the globe. As at the last three WRC conferences, the mobile satellite systems industry requests WRC-03 to allocate additional spectrum to it, in view of an asserted shortage of spectrum foreseen by some positive evolutionary scenarios for the sector.

Nevertheless, the environment within which to provide more spectrum for MSS has been made more difficult by the slow take-up of S-PCS services, given all other competing requirements. The sharing of MSS satellites and their dedicated feeder links with existing services already using the proposed new bands for MSS is also considered to be very challenging technically. The other services potentially affected are passive (i.e. not transmitting, just receiving), such as Radio Astronomy, Earth Exploration and Space Research, as well as active: tactical radio relays, FS, aeronautical telemetry and radar.

#### **Community policy objectives**

MSS systems provide alternative technical means to supply mobile communication services to customers, and their **coverage is often complementary** to terrestrial systems, since they do not have to sustain the incremental cost of additional base stations in sparsely-populated areas. Research on the development of such platforms has thus been substantially supported by the European Union. Any future spectrum needs for MSS according to **realistic market projections** ought to be supported, provided all other relevant radio services can be adequately protected and not unduly constrained.

One of the bands under discussion (1 670-1 675 MHz) for allocation to MSS was dedicated for TFTS (Terrestrial Flight Telephone System) in Europe until recently. As a rule, the Commission strongly believes that any refarming of bands already harmonised in Europe ought not to lead to any lower level of European harmonisation. The selection of new uses for any such band ought to consider explicitly the potential for a harmonised and efficient use of the spectrum, technology neutrality, consequences for competition in any proposed sector, while limiting regulatory constraints as far as possible.

#### **5.4.5. High Altitude Platform Stations (HAPS)**

The HAPS concept has been around for quite a few years but has not materialised commercially yet because of operational difficulties<sup>27</sup>. It essentially concerns the provision of wireless communication services via stratospheric “balloons” high in the atmosphere (around 20 Km). At this altitude, such a platform could cover extensive areas on the ground at, it is claimed, a fraction of the cost of satellites, and replacing a large number of terrestrial repeaters. Furthermore, HAPS elements of a network would be intrinsically flexible, as they could be deployed or relocated relatively simply. This WRC is to investigate the possible identification of additional frequency allocations for HAPS, since the current allocation at 48 GHz is constrained by water absorption in the atmosphere, thus particularly affecting sub-tropical services.

There is also a possibility to use High Altitude Platform Stations as part of an IMT-2000 network. WRC-03 is to consider whether the constraints placed on HAPS operation in the IMT-2000 spectrum around 2 GHz that were determined at WRC 2000 could be relaxed, and how to develop appropriate regulatory and technical provisions to allow the coordination between a terrestrial IMT-2000 system implemented using high altitude platform stations and other existing or planned fixed or mobile services.

#### **Community policy objectives**

Support an adequate provision of spectrum for HAPS, as it could provide an additional means for a rapid roll-out of broadband services (though the technical and commercial feasibility of HAPS is not proven), whilst making sure that all other existing services are adequately protected, in particular that HAPS operations do not harmfully interfere with IMT-2000 base stations on the ground. Nevertheless, if technically feasible, an alternative network topology which could enable the footprints of 3G or of other communication systems to be extended quickly and cost-effectively would be welcome.

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<sup>27</sup> Despite some recent progress, notably via EU-funded RTD (HeliNet project)

## 6. AGENDA FOR THE NEXT CONFERENCE (WRC-07)

One of the main activities of any World Radiocommunication Conference is to establish the agenda for the next conference. Increasingly, these agendas are populated by contentious issues where decisions have previously had to be postponed or made provisional to review as a negotiating compromise. Furthermore, administrations which do not obtain full satisfaction at a conference often present again their requests at the following conference. However, the **inflation in the number of agenda items** treated in each WRC (originally 10-12, 17 in 1997, 27 in 2000 and 45 in 2003) is **straining the process** and affecting the quality and relevance of the results obtained. Therefore, getting an agenda for 2007 which reflects real needs and which does not dissipate so much energy, time and money on revisiting old agenda items is becoming an essential requirement for all spectrum managers and users.

Several suggestions, notably from Europe, have been made on how to rationalise future WRCs, including limiting the number of agenda items; restricting the “rolling nature” of many items; placing precise limits on the scope of agenda items; and having a comprehensive rationale to support new proposals, including assessment of burden on ITU-R administrative and financial resources.

There are a number of possible agenda items for WRC-07 already submitted to CEPT by European interests. They include new harmonised allocations for passive science services (EESS, SRS and RA) above 275 GHz, for aeronautical uses, and for public protection.

### Community policy objectives

It is in the interest of the Community to support initiatives to **limit, prioritise and rationalise** the agenda of future WRC conferences.

It was the Commission’s original intention for the Radio Spectrum Policy Group, one of the elements of the new Community spectrum policy framework, to hold a policy discussion on the spectrum priorities for Europe in a global context, in order to provide relevant guidance to CEPT early enough in the WRC-07 agenda-setting process. However, the later-than-hoped establishment of this group means that this action cannot be undertaken before CEPT’s proposed list of agenda items for WRC-07 is finalised.

## 7. CONCLUSION

This document has provided a brief explanation of relevant WRC-03 issues in the context of existing European Community policies and initiatives. Further descriptions of these issues from a more detailed technical/regulatory point of view can be found in Annex II.

The Council and the European Parliament are called to support the European negotiators to achieve the Community objectives for particular issues, notably:

- Protecting the allocations gained in WRC-2000 by **IMT-2000** and **GALILEO**;
- Making progress towards regionally and globally harmonised frequencies for **PPDR** (Public Protection and Disaster Relief) systems.
- Supporting the establishment of **alternative wireless infrastructure platforms**. In particular, a globally-harmonised status for the spectrum bands identified in Europe for Radio Local Area Networks (**RLAN**) is important.

The Commission is **fully confident** that the preparation by CEPT of European technical positions before and during WRC-03 will deliver results which will assist the various wireless sectors in Europe continuing in their development and bringing benefits to society. At the same time, EU Member States negotiating in WRC-03 will need to ensure that any decisions taken at WRC are in line with their Community obligations.

Following WRC-03, the Commission intends to prepare a Communication on the results of the conference with regards to Community policies and on how to continue providing an optimal coordination between the technical negotiators and Community interests, in the light of the new spectrum policy framework in the Community.

**ANNEX I**  
**SIMPLIFIED AGENDA FOR WRC-2003**

Items in **bold** are addressed specifically in this document.

<b>Agenda Item</b>	<b>ISSUE</b>
1.1	Deletion of superfluous countries from Radio Regulations footnotes
1.2	Introduction of new digital modulation techniques for broadcasting in HF bands
<b>1.3</b>	Identification of global/regional frequency bands for future public protection (emergency situations and disaster relief).
<b>1.4</b>	Review of allocations to the aeronautical radionavigation service and the fixed-satellite service in the band 5 091-5 150 MHz
<b>1.5</b>	Review of allocations to the mobile (RLAN), fixed, Earth exploration-satellite, radiolocation and space research services within the frequency range 5 150-5 725 MHz
<b>1.6</b>	Protection of MSS feeder links operating in the band 5 150-5 250 MHz, in view of the possible new allocation to the mobile service in this band for RLAN applications
1.7	Regulatory issues for radio-amateurs
1.8	Protection of passive services from unwanted emissions from active services
<b>1.9</b>	Consideration of abrogation of some regulatory safety obligations for the maritime service
1.10	Regulatory issues related to the maritime mobile service
<b>1.11</b>	Consideration of new secondary status for aeronautical mobile satellite service at 14 GHz
1.12	Review of allocations for the Space Science and the Earth exploration-satellite services
<b>1.13</b>	Review of frequency allocations for high altitude platform stations (HAPS)
<b>1.14</b>	Measures to avoid harmful interference to maritime mobile & aeronautical mobile safety services
<b>1.15</b>	Review of results of WRC-00 for RNSS systems (including GALILEO)
<b>1.16</b>	Feasibility of new allocations for MSS feeder links near 1.4 GHz
1.17	Upgrade to primary status for the allocation to the radiolocation service in the

	band 2 900-3 100 MHz to satisfy future military radar systems.
<b>1.18</b>	New primary allocation to the fixed service in the band 17.3-17.7 GHz for ITU Region 1
1.19	Misuse of rules to get around power limitations in non-GSO FSS systems
<b>1.20</b>	New global allocations for the non-GSO MSS systems below 1 GHz.
<b>1.21</b>	Regulatory preparations for future terrestrial wireless interactive multimedia applications (TWIMS)
<b>1.22</b>	Consideration of additional spectrum needs for IMT-2000 and Beyond
1.23	Global realignment of the allocations to the amateur, amateur-satellite and broadcasting services around 7 MHz
<b>1.24</b>	Sharing of the 14 GHz band between FSS, RLS and GSO-SRS systems
<b>1.25</b>	Spectrum identification for HDFSS systems above 17.3 GHz.
<b>1.26</b>	Regulatory constraints on the operation of Satellite Earth stations on-board Vessels (ESV)
<b>1.27</b>	Review of satellite broadcasting plan and of coordination procedures between BSS and FSS satellite systems
1.28	Use of a new band for differential correction signals of RNSS systems
1.29	Sharing between non-GSO and GSO systems in the 37.5-50.2 GHz frequency range
<b>1.30</b>	Review of the advance publication, coordination and notification procedures for satellite networks
<b>1.31</b>	Additional allocations to the mobile-satellite service in the 1-3 GHz band
<b>1.32</b>	Sharing between HDFSS, HDFSS and BSS systems at 37.5-43.5 GHz
<b>1.33</b>	Review of High Altitude Platform Stations (HAPS) operating as part of an IMT-2000 network
<b>1.34</b>	Potential future interference problems of IMT-2000 with NGSO BSS (sound) systems in the 2 630-2 655 MHz band
<b>1.35</b>	Review of co-ordination procedures between BSS and FSS networks
1.36	Spectrum available for broadcasting between 4-10 MHz with a view to further allocations
<b>1.37</b>	Study of the various regulatory ways to protect other systems from Highly Elliptical Orbit Systems (HEOS)

1.38	Up to 6 MHz new spectrum to the Earth exploration-satellite service (active) at 420–470 MHz.
1.39	Spectrum requirements below 17 GHz for telemetry, tracking and command (TT&C) functions of fixed satellite service networks operating above 17 GHz.
2	Procedural issue
3	Procedural issue
4	Procedural issue
5	Procedural issue
6	Procedural issue
7.1	Procedural issue
<b>7.2</b>	Setting the agenda for WRC-2007



**ANNEX II**  
**ANALYSIS OF TECHNICAL ISSUES**

**THIRD GENERATION MOBILE COMMUNICATIONS**

**Protecting the additional radio spectrum bands identified as Europe' preferred choice:**

Agenda item 1.34 has to review the result of studies concerning threshold values for non-GSO BSS (sound) systems in the band 2 630-2 655 MHz and take action to protect IMT-2000 services as required. The studies carried out by ITU in preparation of this agenda item have been difficult, complicated by the multiple possible operating parameters both of non-GSO satellites and of IMT-2000 mobile and base stations, and have not led to a set of threshold values acceptable to all sides. Furthermore, threshold power limits to be applied to BSS (sound) systems in region 3 can also be affected by the direction of transmission of IMT-2000 systems which has not been defined for this band yet<sup>28</sup>.

Nevertheless, some of the studies have shown that under specific operating conditions, the potential interference of BSS satellites would require an 11% increase in the number of IMT-2000 base stations deployed to provide the same Quality of Service<sup>29</sup>. Europe is therefore proposing **stricter transmission power limits** than in WRC-00 for non-GSO and GSO BSS systems operating in this band, to provide a clear protection to IMT-2000.

The position of other countries (notably from Asia) is that they would **retain** the WRC-00 threshold limits, but in addition would like to apply standard regulatory agreement or coordination procedures between geostationary satellites and terrestrial services if the limits were exceeded, extending such procedures also to non-GSO BSS satellites<sup>30</sup>. However, this approach is not satisfactory for Europe, as it would be questionable how much protection it would provide to IMT-2000 operations in Europe in practice. Furthermore, considering the prospected time-scale for the use of the band in Europe, (currently expected to be around 2008), the maximum time limit of three years defined in the coordination procedure between the operation of the satellite and the objection by a European administration being interfered with would clearly be insufficient.

**Beginning the preparations for future spectrum allocations for IMT-2000 and beyond:**

Agenda item 1.22 will consider the progress of ITU-R studies **concerning future developments of IMT-2000 and systems beyond IMT-2000**. Since WRC-00, ITU-R has developed a "vision" for these systems predicated on distinct though overlapping technology trends, where the capabilities of IMT-2000 technology will be continue to be gradually enhanced, while developing interactions with other wireless technology such as digital broadcasting and RLANs. At the same time, new wireless access methods will go beyond

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<sup>28</sup> *i.e.*, the coordinated segmentation of parts of a band in "channels" which may be from the base station to the mobile phone ("downlink") or *vice versa* ("uplink"), in order to avoid interference between operators and adjacent countries and render the use of the band more efficient. The Commission is in the process of mandating CEPT to carry out the "channelisation" of the extension band for IMT-2000 in Europe, but at the moment it is not possible to state whether the 2630-2655 MHz section of the band will be in the "downlink" or the "uplink" direction.

<sup>29</sup> Note that harmful interference would be even more difficult to control if these satellites operated over Belorussia, the only Region 1 country allowing BSS (sound) in this specific band. However, it appears that this will not happen and Belorussia will remove its name from the relevant footnote.

<sup>30</sup> There are a number of distinct "procedures" in the ITU Radio Regulations defining formal bilateral negotiations to avoid harmful interference between systems and countries.

IMT-2000 to extremely high data rates (such as 100 Mbit/s for highly-mobile applications or even 1 Gbit/s for lower mobility applications). It is widely agreed that further studies will need to be carried out in time for the WRC-07 conference. These studies will consider the timing and demand for additional spectrum, and the possibility for sharing this spectrum with other existing services. To be decided yet at WRC-03 is the exact guidance to ITU-R on the scope of the studies, i.e. on whether mainly on the IMT-2000 family or also on “systems beyond”.

### **SATELLITE RADIO NAVIGATION**

WRC-03 agenda item 1.15 addressing RNSS questions is divided in three separate issues covering distinct frequency bands. In the band **1 164 – 1 215 MHz**, WRC-00 introduced a provisional power limit (so-called “pfd limit”) of [-115dB (W/m<sup>2</sup>) per MHz] which needs to be verified at WRC-03. The limit was introduced to protect aviation radionavigation aids (ARNS) essential for the safety of air traffic, such as DME and TACAN, which will continue to operate in this band up to 2015 and beyond. Following additional compatibility studies, the long-term protection of these aviation systems is to be ensured by a new aggregate epfd limit of [-121.5 dB (W/m<sup>2</sup>) per MHz] proposed by CEPT, with the support of other regions. Furthermore, it is accepted that RNSS will not claim any protection from ARNS. There are also still unresolved issues about coordination between different RNSS systems in this band. In order to ensure an equitable distribution of the spectrum resource, CEPT proposes additional power limits *per satellite* (and not just per system). One of the main issues will be the implementation of a clear and equitable process for the verification of these specific epfd limits by administrations that have filed an RNSS system.

For the band **1 215 – 1 300 MHz**, CEPT proposed at WRC-2000 to introduce in this band a power limit to protect long-range primary radar used in aviation for en-route positioning of aircraft. Primary radar gives aircraft position information to Air Traffic Control (ATC) and is the only means today to follow aircraft that are not equipped with transponders (SSR) or with their transponders switched off. However, due to the strong opposition of the US and Russia in constraining their existing GPS and GLONASS systems in this band, a further discussion on this issue based on new studies to assess the need for and the value of the pfd limit was reported back to WRC-03.

Theoretical and statistical studies have shown that the existing pfd level of GPS and GLONASS systems should already exceed some primary radar protection criteria. However, no interference by RNSS on aviation radar has actually ever been recorded. Europe has supported studies on the development of pfd limits for operation in the whole band 1 215-1 300 MHz, paying due account to the existing successful sharing between RNSS and radar in this frequency band, and ensuring that no regulatory discrimination could be applied to Galileo, for instance by introducing a protection limit only in the part of the band to be used by Galileo (1 260-1 300 MHz). However, following simulation and experimental studies, it has proved impossible to find a power limit to protect aviation radar while at the same time not constraining existing RNSS systems. CEPT therefore does not propose an explicit power limit for RNSS in this band, though it will have to operate on a clear non-interference basis with primary radar over the whole band, the latter being important due to the increased emphasis on security.

A much less critical issue for Galileo concerns the band **5 010 – 5 030 MHz**, where a provisional pfd limit for out-of-band emissions from RNSS was approved by WRC-2000 to protect the radio astronomy service below 5 GHz. This pfd limit for the RNSS is subject to revision at WRC-03. While the use of the 5 GHz band by Galileo is only expected in the long

term (perhaps around 2015), CEPT proposes some specific power levels for GSO and non-GSO RNSS systems to protect the radio astronomy service.

### **PUBLIC PROTECTION (EMERGENCY SITUATIONS AND DISASTER RELIEF).**

This issue is dealt with in WRC-03 agenda 1.3, which calls for studies on the identification of frequency bands that could be used on a global/regional basis by administrations intending to implement future solutions for public protection agencies and organisations, including those dealing with emergency situations and disaster relief.

The ITU studies have focussed on the actual user needs and applications, on the possible benefits of spectrum harmonisation and on a methodology to calculate spectrum requirements, as well as on the means to improve cross-border circulation of radiocommunication equipment in emergency and disaster relief situations. Different so-called “narrow-band”, “wideband” and “broadband” systems have also been defined in terms of technical characteristics and operational requirements. Given the great diversity in spectrum use and operational needs, there is an overall agreement that frequency band ranges for PPDR should be identified as far as possible, but that countries should retain the flexibility to implement as much of the harmonised bands for PPDR as they need whenever they so choose.

In order to allow the market to grow flexibly, alternative solutions have also been proposed, such as or using current or future commercial mobile technology and frequency bands. However, proponents of dedicated PPDR spectrum harmonisation consider that civil protection operational requirements are specific (redundancy, scalability, one-touch group calls, network access reliability in an emergency...) and cannot be fully catered for by existing cellular technologies.

Taking into account the previous considerations, Europe’s position is that at least the digital narrow-band spectrum already harmonised in Europe<sup>31</sup> should be identified globally for PPDR. These frequencies would be part of a “tuning range” band identified for PPDR between 380 and 470 MHz, which countries could use according to their existing spectrum uses and changing civil protection requirements. Consideration for additional studies on PPDR harmonisation would be included in the agenda of WRC-07, to take into account the development of the technology and the long-term need for data-rich systems (broadband) to use higher frequencies than those currently identified.

### **RADIO LOCAL AREA NETWORKS**

WRC-03 is addressing RLAN by considering at the same time the status of all the various services operating in the 5 GHz band. Europe proposes new primary allocations to the mobile service in the bands 5 150-5 350 and 5 470-5 725 MHz, together with specific mitigation techniques to protect the existing primary services and radar. However, the DFS (Dynamic Frequency Selection) mitigation technique used in most of the 5 GHz bands identified for RLAN in Europe to avoid interfering with radar, has now been defined by the relevant ITU study group with power threshold limits which are more restrictive than applied until now in Europe. While radars are better protected, it becomes more difficult for RLAN manufacturers to ensure these systems can operate adequately and cost-effectively.

In order for other services in the 5 GHz band to be at the same regulatory level as, and therefore adequately protected from, the new RLAN mobile allocation, they are also proposed

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<sup>31</sup> The 380-385 and 390-395 MHz bands, by ERC Decision (96)01.

to be upgraded to primary status (agenda item 1.5). These services include Earth exploration-satellite (active) and space research (active) services in the frequency range 5 460-5 570 MHz, and the radiolocation service in the frequency range 5 350-5 650 MHz. Europe agrees to this approach, provided that no additional constraints are placed on RLANs. Furthermore, in order to protect MSS feeder links operating in the band 5 150-5 250 MHz, it is proposed to restricts the use of stations of wireless access systems including RLANs to indoor use with transmission limits in this band, as already happens in Europe (agenda item 1.6).

### **HIGH-DENSITY FIXED SATELLITE SERVICES**

HDFSS are addressed in WRC-03 in agenda items 1.18, 1.25 and 1.32. The general approach in Europe for these systems is that, rather than giving them exclusive identification in some bands, they have to share frequencies with existing services wherever possible, since segmentation of spectrum tends to lead to inefficient use. Given the possibility of harmful interference, sharing of HDFSS with existing terrestrial services needs also to be demonstrated to be clearly feasible. If bands which are already used by terrestrial services are also identified for HDFSS, this should be done on an unprotected basis for HDFSS. However, the European satellite sector would much prefer band segmentation and feels strongly that such an approach is not beneficial to the satellite sector, since many of the mitigation techniques imposed on it to protect terrestrial services are too constraining.

Europe has identified possible global bands for HDFSS in the “Downlink” and “Uplink” directions (i.e. space-to-Earth or *vice versa*) at 19.7-20.2 GHz (D), 29.5-30 GHz (U), 39.5-40.5 GHz (D), 47.2-50.2 GHz and parts of 27.5-29.5 GHz (U). CEPT would also accept the band 17.3-17.7 GHz for HDFSS in Region 1 (i.e. Europe), since the fixed service allocated to this band is currently operating in very few European countries. In order to protect RAS, military uses, HAPS, FS and FSS from uncoordinated and ubiquitous HDFSS terminals, CEPT does not support the identification of other bands on a global basis, as suggested by administrations outside Europe, (notably 17.7-19.7 GHz (D), 37-39.5 GHz (D), 40.5-42 GHz (D) and other parts of the 27.5-29.5 GHz band).

WRC-03 has also been tasked (agenda item 1.32) to review the operational parameters of the sharing plan for the 37.5-43.5 GHz band between HDFS, HDFSS, BSS and RAS agreed at WRC-00. In Europe, this frequency range is currently covered by three ERC decisions<sup>32</sup>, the first designating the band 40.5-43.5 GHz for HDFS, the second giving priority for FS with regards to uncoordinated FSS terminals in the band 37.5-39.5 GHz and providing the band 39.5-40.5 GHz for HDFSS; finally, the third giving priority for HDFS with respect to uncoordinated FSS terminals in the band 40.5-42.5 GHz. CEPT supports the existing limits in the bands 37.5-40 GHz and 40.5-42.5 GHz for FSS, MSS and BSS. In addition, CEPT supports power limits and possible mitigation techniques to protect stations in the radio astronomy service operating in the 42.5-43.5 GHz band.

As well as frequency allocation matters, WRC-03 will address regulatory issues for HDFSS. CEPT does not support any modification to the provisions applicable to the coordination, notification and registration of typical HDFSS Earth stations, since such a simplified approach could pose difficulties to other wireless services.

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<sup>32</sup> ERC Decisions (00)02, (00)07 and (00)09.

## **BROADBAND SERVICES IN AIRCRAFT**

Agenda item 1.11 of WRC-03 is concerned with including the operation of the aeronautical mobile-satellite service (AMSS) on a secondary basis in the band 14.0-14.5 GHz as an MSS uplink, while protecting the primary services operating in this band, notably the fixed-satellite (Earth-to-space), fixed, radionavigation, and mobile services (though for these last two there is no actual operation). There are also some secondary services in this band: space research, radionavigation-satellite and radioastronomy.

The CEPT position is to support this secondary allocation to AMSS. However, in order to protect all primary and secondary services in the band from harmful interference due to the proposed new AMSS system, some protection criteria have been worked out in an ITU Recommendation, in particular to protect the fixed services currently operating in some countries. The main question during the preparation of WRC-03 for this item has been whether to include the protection criteria directly in a footnote in the ITU Radio Regulations or whether to leave them in the Recommendation (considered to be less constraining on AMSS by some). Most countries, including in Europe, do not support such an additional regulation, since the regulatory status of a secondary service means that it is anyhow by definition compelled to avoid harmful interference against primary services in the same band. It is understood that if some European countries wish to anchor the AMSS protection criteria more solidly in the Radio Regulations, they will recur to specific country footnotes. At the same time, it is likely that non-European countries with already a footnote allowing FS in the band will adopt the protection criteria defined by ITU-R

## **MOBILE SATELLITE SERVICES (MSS)**

MSS requirements are addressed in the WRC-03 via agenda items 1.16, 1.20 and 1.32. Concerning a new global allocations for MSS operating below 1 GHz, Europe is not convinced that additional spectrum is justified for MSS in bands which are already heavily used in Europe by terrestrial and passive services. In addition, the possibility of sharing with terrestrial services (notably PMR at 450-470 MHz) is unproven and probably not possible with reasonable operational constraints for either side. The same reasoning applies to spectrum requirements for MSS feeder links. Therefore, according to CEPT, any eventual market growth of MSS systems below 1 GHz will have to be accommodated within existing allocations.

Concerning additional spectrum for MSS between 1-3 GHz, this issue was already discussed at WRC-97 and WRC-2000. The sector has estimated a maximum requirement of spectrum by 2010 of about 2x675 MHz<sup>33</sup>, though these requirements are based on assumptions which are not currently accepted by most administrations. However, there does appear to be a shortfall of about 2x8 MHz by 2005 (required 2x123 MHz v. the existing allocation of 2x115 MHz) Therefore, the allocation of some additional spectrum (2x7 MHz) has been under discussion. CEPT supports a global allocation to MSS (space-to-Earth) in the band 1 518-1 525 MHz, though there may be a significant difficulty with compatibility with aeronautical mobile telemetry (AMT) operating in the United States. Furthermore, Europe favours the complementary global allocation to MSS (Earth-to-space) in the band 1 670-1 675 MHz, one of the two bands where TFTS was supposed to operate in Europe, together with possibly an additional 2 MHz between 1 668-1 670 MHz, in order to obtain a global allocation of 2 x 7 MHz in total.

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<sup>33</sup> ASMS-TF-commissioned study, "Assessment of Spectrum Requirements to MSS", 19 September 2001

## **HIGH ALTITUDE PLATFORM STATIONS (HAPS)**

WRC-03 was mandated to investigate the possibility of allowing HAPS to operate in additional bands (agenda item 1.13). Concerning 48 GHz, Europe is in favour to continue with the current regulatory arrangements, pending the commercial and technical development of these platforms. In general, Europe does not support new identifications for HAPS, given that significant needs for this application have not been established. In addition, for the 18-32, 27.5-28.35, and 31.0–31.3 GHz bands, Europe does not support the introduction of HAPS in these bands, since it does not believe the protection of existing services (such as EESS and radio astronomy) could be ensured.

Concerning HAPS within IMT-2000 (agenda item 1.33), the results of WRC-00 enabled this new platform to operate as base stations in IMT-2000 networks at several frequencies, though a review of the provisional operating conditions (power flux density limits, pfd) of HAPS in these networks was also requested at WRC-03. CEPT proposes a limited relaxation (by 4.5 dB) of the power limit for HAPS. In order to further protect other IMT-2000 operators, CEPT wishes to reinforce the obligation of HAPS operators to notify their stations and to ensure that administrations which licence HAPS stations commit themselves in applying the agreed operational criteria. According to CEPT, the regulations also have to be clear that HAPS (IMT-2000) base stations can transmit only in the 2 110-2 170 MHz band.

**ANNEX III**  
**OTHER WRC-03 ISSUES OF INTEREST TO THE COMMUNITY**

**SATELLITE BROADCASTING**

Following pressure from developing countries, the last conference (WRC-2000) produced a revision of the plan governing the equitable sharing of the spectrum (12/17 GHz band) and orbital resources for satellite broadcasting between different countries in ITU Regions 1 and 3 (Europe, Africa and Asia). In the new plan, ten broadcasting channels have been pre-assigned to each country, while various provisions in the plan allow existing or planned European satellite systems (especially FSS) to continue operating. However, in order to facilitate the coexistence between different systems, Europe would like to relax sharing requirements, which some studies have demonstrated to be excessive, and to take due account of existing FSS systems in the coordination procedures established (agenda items 1.27 and 1.35).

The **Community policy objectives** are to support the development of a competitive broadcasting market in Europe by ensuring a fair and efficient distribution of resources (orbital positions, channels) needed for satellite broadcasting, including cross-border systems within Europe, in order to provide European citizens with access to balanced and diverse audio-visual content. Spectrum planning principles should allow for flexible usage to cater for system deployment tailored to market demand.

**TERRESTRIAL WIRELESS INTERACTIVE MULTIMEDIA APPLICATIONS (TWIM)**

This is another open-ended issue at WRC-03, in preparation for possible more concrete action in WRC-07 (or later), and is meant to address the whole topic of “convergence” between radio applications, which opens up questions on the flexibility of radio service definitions and regulation, and of the possibility for long-term spectrum access for convergent applications. A draft definition for TWIM has been provided within the ITU, as being “*applications in one or more of the terrestrial mobile, fixed and broadcasting services that are capable of supporting bidirectional exchange of information of more than one type (such as video, image, data, voice, sound and graphics) between users or between users and servers, and with different levels of interactivity and mobility.*”

There is an understanding by most administrations that studies in view of WRC-07 will need to focus on identifying possible frequency bands for TWIM applications, the extent of spectrum harmonisation which is to be encouraged for such systems, and reviewing the existing radiocommunication services definitions.

Europe’s position is that regulations hindering the development of TWIM applications ought to be modified, once the effects of convergence on user needs are understood. The main regulatory impediment which some have identified within Europe is in the 470-790 MHz broadcasting band, where there is no general co-allocation for the mobile and fixed services, and therefore any application based on a mix of all these services would have difficulties to operate in this important band. The forthcoming RRC-04 conference revising the Stockholm ’61 arrangement to prepare the switchover from analogue to digital broadcasting in Europe, is also addressing related issues, and therefore a degree of coordination between these activities is required.

For the **Community**, it is clear that in an environment of digital convergence the development of advanced mobile systems cannot be seen in isolation from other access platforms such as digital broadcasting and RLANs. The Commission is fostering a widespread access to the

Information Society services using different platforms which should be interoperable for the benefit of the citizen and the development of innovative content. It is important therefore to study the impact of technical, service and content convergence on spectrum management activities, in order to provide the necessary regulatory flexibility at national and global level, and thus improve the supply of spectrum to applications which will make optimal use of it.

It is expected that the impact of “convergence” on spectrum management will need a high-level policy discussion in the Community, and therefore the Radio Spectrum Policy Group is likely to be tasked to analyse this issue, notably in the context of the expected switchover from analogue to digital broadcasting in Europe.

#### **POSSIBLE CHANGES TO THE NOTIFICATION PROCEDURES FOR SATELLITE NETWORKS.**

The increasing complexity and volume of satellite network notifications has resulted in very large backlogs in the processing. On the other hand, the time to build and launch satellites is decreasing and the long processing delays by the ITU are not consistent with these shorter times. Consequently, one approach to improve this situation would be to introduce simplifications in the ITU procedures without sacrificing the main objectives of these procedures (agenda item 1.30).

It is **important for the Community** to support any simplification of the ITU procedures, in order to overcome the “paper satellite” problem and the related backlog, thus facilitating the access to spectrum by real systems.

#### **EARTH STATIONS ON BOARD VESSELS (ESV)**

This agenda item (no. 1.26) was not resolved at WRC-2000. Earth Stations on board Vessels (ESV) supply ships with high-speed data, voice and video applications using existing fixed-satellite service (FSS) networks operating in the 4 GHz band (downlink) and 6 GHz band (uplink). Other FSS allocations at 11 and 14 GHz are also under consideration for ESVs. However, all these bands are extensively used in Europe for long-haul, high-capacity systems and cellular backbone networks (fixed service – FS). ESVs, potentially operating from many ships, must not cause harmful interference to these FS systems, and avoid constraining their expected growth. This can be ensured by introducing appropriate technical and operational limitations on ESVs, including a minimum distance from the coast (between 125 and 300 Km, depending on the frequency) where they can be switched on. With this approach, the minimum ESV antenna diameter could also be reduced. In case administrations wished to authorise the use of ESV inside the minimum separation distance, adequate coordination methodologies with FS would need to be used.

The **policy objective** for the Community for this issue would be to obtain a regulatory regime not unduly hindering the provision of new satellite broadband communication services on ships, though it is essential to ensure the long-term protection of the Fixed Service operating in the same bands, literally the “backbone” of telecommunication and mobile networks in Europe. Nevertheless, it is questionable whether managing potential interference by artificially limiting the spread of wireless systems via mandatory minimum antenna sizes is an appropriate regulatory principle.



## **SHARING OF SATELLITE EARTH STATIONS WITH OTHER SERVICES AT 14 GHz**

The same type of antenna diameter limitation on FSS Earth station antennas was introduced at WARC-92 in the 13.75-14 GHz band to the fixed-satellite service (FSS) (Earth-to-space), in order to limit the number of such systems and thus protect the other services in the band (radiolocation, radionavigation, space research), and in particular mobile military radar (missile tracking systems). However, using smaller antenna diameters (from a minimum 4.5 m to perhaps 1.2 m) is strongly supported by the satellite operator industry, and by many developing countries, which favour affordable VSAT services for reasons of economic coverage of their territory. Agenda item 1.24 is looking at this difficult issue, though no solution has been found yet, including in Europe.

From a **Community** point of view, an acceptable compromise needs to be found, in order to introduce network cost savings in the satellite sector by relaxing operating requirements, while fully addressing the concerns of important military radar systems in this band, by for instance introducing limits on the transmission power of smaller FSS earth stations.

## **SAFETY REGULATIONS FOR THE MARITIME SERVICE**

In order to promote the migration of maritime distress and safety communications systems from traditional analogue technologies to GMDSS (Global Maritime Distress and Safety System), the ITU has introduced a long transition period and double procedures with old distress and safety systems. However, many vessels have still not upgraded to GMDSS, well beyond the end of the original transition period. WRC-03 was originally tasked to verify the possibility to update relevant maritime safety regulations (agenda item 1.9), but due to the fact of the continued use by many ships of the old distress and safety systems, there is near-universal consensus in keeping the regulatory *status quo* for the time being.

Concerning measures to address harmful interference to maritime mobile & aeronautical mobile services (agenda item 1.14), there is a growing concern that routine or illegal communications between ships is impacting on distress and safety-of-life communications of ships and aircraft in the HF bands in the two distress signal bands. WRC-00 decided to remove any calling facilities from the GMDSS distress channels as from the end of 2003, in order to safeguard safety communications above “social” calls, though there are concerns that this will leave ships without adequate means of communicating routine messages. CEPT proposes to continue using these two frequencies for limited general calling for safety related communications, subject to certain safeguards.

The general **policy objective for the Community** would be to support maritime safety via the protection of safety-of-life communications and the gradual move to new digital maritime distress and safety systems, with due consideration for the slow implementation of the change in many vessels.

## **AVIATION REQUIREMENTS AT 5 GHz**

Within the context of the overall discussions about the 5 GHz band (see section 5.4.1), there is an issue of sharing between FSS and aviation in part of the band (agenda item 1.4). CEPT wants to keep the primary allocation for the Fixed Satellite Service (FSS) in the 5 091-5 150 GHz band until 2 018, and not until 2 010, as agreed originally, when FSS was to be downgraded to a secondary allocation (i.e. more protection for the aeronautical Radionavigation service (ARNS) sharing this band). The reason for this postponement is that, according to CEPT, neither FSS nor new aviation systems to replace MLS have developed as

quickly as planned, and therefore there is no need to modify the band allocation for the foreseeable future. However, the aviation community thinks that this band could be used for surface movement of aircraft at airports or for cockpit surveillance by 2010 and would therefore like some action before then<sup>34</sup>.

The **Community** needs to increasingly consider the aviation sector's safety and operational requirements within the contest of the Single European Sky.

### **HIGHLY ELLIPTICAL ORBIT SATELLITES**

The special characteristics of satellites with highly elliptical orbits (HEOS) and their possibilities to share spectrum bands with all other types of satellite and terrestrial systems need to be studied (agenda item 1.37), in order to identify any specific regulations to be applied to these new types of satellites. No satisfactory definition of HEOS has been agreed upon, and mutually satisfactory mitigation solutions with other services have also not been identified. Europe's position is that HEOS should continue having the same regulatory status as other non-GSO systems. This is another open-ended agenda item with a lot of different frequencies to be covered, and more work may need to be carried out at WRC-07.

It is in the **Community's interest** to promote equitable and equal regulatory treatment in the ITU Radio Regulations of all types of satellite systems, while affording suitable protection to affected services.

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<sup>34</sup> The need for both of these applications has been exemplified by recent events: the Milan airport runway collision in December 2001, and the plane hijackings in the US on 11/09/2001.

## ANNEX IV

### GLOSSARY

AMSS	Aeronautical Mobile Satellite Service
APT	Asia-Pacific Telecommunity
ARNS	Aeronautical Radio-Navigation Service
BSS	Broadcast Satellite Service
CEPT	European Conference of Postal and Telecommunications Administrations
CITEL	Commission of Inter-American Telecommunications Administrations
DME	Distance Measuring Equipment
ECP	European Common Proposal, to be adopted by CEPT
EESS	Earth Exploration Satellite Services
ECC	Electronic Communications Committee
ERC	European Radiocommunications Committee
ESA	European Space Agency
ESV	Earth Stations on board of Vessels
EU	European Union
FS	Terrestrial fixed systems
FSS	Fixed Satellite Service
GALILEO	European satellite-based navigation and positioning system
GLONASS	Russian Global Orbiting Navigation Satellite System
GMES	Global Monitoring for the Environment and Security
GNSS	Global Navigation Satellite System
GPS	Global Positioning System of the United States
GSM	Global System for Mobile Communications
GSO	Geostationary Orbit
HAPS	High Altitude Platform System
HDFSS	High-Density Fixed Satellite Service
HIPERLAN	An RLAN standard
IMT-2000	International Mobile Telecommunications for the year 2000
ITU	International Telecommunications Union

ITU-R	Radiocommunication Sector of the ITU
MSS	Mobile Satellite Service
NGSO	Non-Geostationary Orbit
PMR	Private Mobile Radio
PPDR	Public Protection and Disaster Relief
RAS	Radio Astronomy Service
RLAN	Radio Local Area Network
RNS	Radio Navigation Service
RNSS	Radio Navigation Satellite System
RR	Radio Regulations of the ITU
RRC	ITU Regional Radio Conference
RSC	Radio Spectrum Committee
RSPG	Radio Spectrum Policy Group
RTD	Research & Technological Development
S-PCS	Satellite Personal Communications Services
SRS	Space Research Service
SSR	Secondary Surveillance Radar
TFTS	Terrestrial Flight Telephone system
TWIMS	Terrestrial Wireless Interactive Multimedia Systems
WRC	World Radiocommunications Conference
WTO	World Trade Organisation